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PART IV.

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EXPLORATIONS AND SURVEYS FOR A RAILROAD ROUTE FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.
WAR DEPARTMENT.

ROUTES IN CALIFORNIA AND OREGON EXPLORED BY LIEUT. R. S. WILLIAMSON, CORPS OF TOPOGRAPHICAL ENGINEERS, AND LIEUT. HENRY L. ABBOT, CORPS OF TOPOGRAPHICAL ENGINEERS, IN 1855.

ZOOLOGICAL REPORT.

WASHINGTON, D. C.
1857.

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BY W. G. BINNEY,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES, PHILA.

No. 4.

REPORT UPON REPTILES COLLECTED ON THE SURVEY.

BY S. F. BAIRD,

ASSISTANT SECRETARY OF THE SMITHSONIAN INSTITUTION.

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PREFATORY NOTE TO PART IV.

THE information collected by the expedition in the department of Natural History is embodied in this portion of the Report. It is proper to state that the credit for whatever of value the papers may contain is due, in a great measure, to the Smithsonian Institution. The outfit and instructions of the zoologist were prepared, and the specimens themselves arranged and preserved by this Institution. Under its supervision and within its walls the necessary illustrations have been executed, the determination of species made, and the reports themselves revised for publication.

The zoologist of the expedition, Dr. E. Sterling, of Cleveland, Ohio, dissolved his connection with the party on reaching Fort Dalles, in consequence of ill health. Subsequent to that time the duties of zoological collector were chiefly performed by Dr. J. S. Newberry. The latter gentleman left the party soon after Dr. Sterling, and returned, by water, from Oregon to San Francisco. In consequence of his absence and of the Indian disturbances on the route, a comparatively small zoological collection was made in the region traversed west of the Cascade Range. Mr. C. D. Anderson, however, secured and preserved several valuable specimens on this portion of our line of survey. While waiting for the arrival of the party, Dr. Newberry zealously occupied himself in making a valuable and extensive collection in the markets and the vicinity of San Francisco.

The expedition is also largely indebted to Lieutenant W. P. Trowbridge, Corps of Engineers, and to other gentlemen who have taken advantage of a long residence in the west to collect and preserve zoological specimens. Their contributions have been transported to Washington, deposited in the Smithsonian Institution, and described in the following reports with those made by the collectors of the party.

HENRY L. ABBOT,
Lieut. Corps of Top. Engineers.

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No. 1.

REPORT UPON FISHES COLLECTED ON THE SURVEY.

BY CHARLES GIRARD, M. D.

I. FAMILY PERCIDAE.

1. AMBLOPLITES INTERRUPTUS, Grd.

PLATE II, figs. 1–4.—*General Report upon Fishes.*

Posterior extremity of maxillary bone reaching a vertical line drawn back of the pupil. Posterior margin of caudal fin subemarginated. Origin of anal fin situated opposite the eleventh ray of the dorsal. Interrupted dark bands on the sides; two vittae diverging from the eye, one running towards the opercular spot, the other obliquely downwards.

Known as *Perch* in the markets of San Francisco. The fish is very much esteemed as an article of food.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
279	1	Adult--	Sacramento river, Cal.----	1855	Dr. Newberry-------	--------	Alcoholic.

II. FAMILY HETEROLEPIDAE.

2. CHIROPSIS PICTUS, Grd.

PLATE XX, figs. 1–4.—*General Report upon Fishes.*

Dorsal fins contiguous; caudal fin subtruncated posteriorly. Ground color dark brown, with numerous vermilion spots, bordered with black, upon the sides and lower fins; under surface of head, throat, and belly, whitish or yellowish.

Called *Sea Trout* and *Rock Fish* at San Francisco; it is a comestible and very fine fish.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
267	1	Adult--	San Francisco, Cal. ------	1855	Dr. Newberry-------	--------	Alcoholic.

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3. OPLOPOMA PANTHERINA, Grd.

PLATE XVIII, figs. 1–3.—*General Report upon Fishes.*

Body elongated and tapering. Upper surface and sides of head granular; preopercular spines few, small, and obtuse. Posterior extremity of maxillary extending beyond the orbit. Origin of anterior dorsal fin situated in advance of the convexity of the preopercle. Scales extending over the base of both the caudal and pectoral fins. Blackish brown above, reddish brown beneath; dorsal and lateral regions spotted with black.

No vernacular name of this species has, so far, come to our knowledge.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
275	1	Adult.	Cape Flattery, W. T.	1855	Lieut. Trowbridge		Alcoholic.

4. OPHIODON ELONGATUS, Grd.

PLATE XVIII, figs. 4–7.—*General Report upon Fishes.*

Body lanceolated. Head subconical and depressed; mouth deeply cleft; posterior extremity of maxillary extending to the vertical of the posterior rim of the orbit. Spinous portion of dorsal fin much longer than the articulated portion; anal fin a little longer than the soft portion of the dorsal; caudal slightly emarginated posteriorly; extremities of pectorals nearly even with the tips of the ventrals. Color above olivaceous brown, scattered all over with blackish, subcircular spots; beneath yellowish.

We have heard of no vernacular name, as yet, for this fish.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
277	2	Adult.	Humboldt bay, Cal.	1855	Lieut. Trowbridge		Alcoholic.

III. FAMILY COTTIDAE.

5. COTTOPSIS GULOSUS, Grd.

General Report upon Fishes.

Origin of anterior dorsal fin situated opposite the insertion of the upper ray of the pectorals. First ray of anal fin placed under the fourth of the second dorsal. Extremities of pectorals extending beyond the origin of the anal. Skin generally smooth; lateral line undergoing a sudden fall upon the peduncle of the tail. Reddish brown, spotted, and transversally barred with black; beneath, unicolor.

This is a "fresh water bull head," or "miller's thumb."

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List of specimens.

Catalogue number.	No. of specimens	Sex and age.	Locality.	When collected	Collected by—	Original number.	Nature of specimens.
292	2	Adult.	Upper Pit river, Cal. -----	1855	Dr. Newberry-------	--------	Alcoholic.

6. COTTOPSIS PARVUS, Grd.

General Report upon Fishes.

Origin of first dorsal situated posteriorly to the insertion of the upper ray of the pectorals. First ray of anal placed under the fourth of the second dorsal. Extremities of pectorals extending to the anterior margin of the anal. Skin generally prickly; lateral line slightly deflected upon the peduncle of the tail. Olivaceous, maculated with blackish.

Here is another kind of "fresh water bull head," or "miller's thumb."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
293	2	Adult.	Monterey, Cal. ----------	1855	Lieut. Trowbridge ---	--------	Alcoholic.
294	4	♂ ♀	Presidio, Cal. ----------	1853	--------do----------	--------	------ --------

7. OLIGOCOTTUS MACULOSUS, Grd.

General Report upon Fishes.

Head subconical. Mouth moderately cleft; posterior extremity of maxillary extending to a vertical line intersecting the pupil. A stoutish bicuspid process upon the convexity of the preopercle. Two acute nasal spines. Dorsal fins contiguous. Origin of anal situated in advance of the anterior margin of second dorsal. Yellowish brown above, mottled or variegated with blackish; a series of blotches of a deeper hue along the dorsal region. Lower half of the sides vermiculated. Abdomen of a bright saffron hue in the male. Inferior surface of head with traces of black markings. Throat and abdomen unicolor, as also the ventrals and anal. Dorsals, caudal, and pectorals transversally barred with black.

A fish not known among fishermen; hence we are not aware of its having received a common name.

List of specimens.

Catalogue number.	No. of specimens	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
298	6	Adult.	Bay of San Francisco, Cal.	1855	Lieut. Trowbridge ---	--------	Alcoholic.

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8. OLIGOCOTTUS GLOBICEPS, Grd.

General Report upon Fishes.

Head rounded anteriorly. Mouth moderately cleft; posterior extremity of maxillary extending to a vertical line drawn posteriorly to the pupil. Rudimentary spines upon the preopercle. Two acute nasal spines. Dorsal fins separated. Origin of anal situated a little posteriorly to the anterior margin of the second dorsal fin. Reddish brown; upper regions maculated with black; beneath unicolor and lighter.

We know of no vernacular name for this species.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
300	4	♂ ♀	S. Farallones, Cal.	1855	Lieut. Trowbridge		Alcoholic.

9. LEPTOCOTTUS ARMATUS, Grd.

PLATE XV, fig. 2.—*General Report upon Fishes.*

Head much depressed; upper jaw longer than the lower; posterior extremity of maxillary extending a little beyond the vertical of the posterior rim of the orbit. A preopercular process, provided with three spines, directed upwards. Blackish brown above, whitish beneath; dorsals, caudal, and pectorals yellowish, barred with black; anterior dorsal with a black spot posteriorly; ventrals and anal whitish.

"Marine Bull Head" is a name applied to this and other species of the same family.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number	Nature of specimens.
311	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

10. LEIOCOTTUS HIRUNDO, Grd.

PLATE XVI, figs. 2 and 3.—*General Report upon Fishes.*

Snout declivous and rather pointed; posterior extremity of maxillary provided with two or three barbels, and reaching a vertical line drawn a little beyond the anterior rim of the orbit. Superior regions blackish brown; whitish under the abdomen, and yellowish under the tail.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
313	1	Adult.	Island of San Miguel, Cal.	1855	Lieut. Trowbridge		Alcoholic.

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11. SCORPÆNICHTHYS MARMORATUS, Grd.

PLATE XVI, fig. 1.—*General Report upon Fishes.*

Membranous flaps upon the upper and posterior part of the orbit, upon the snout, and at the posterior extremity of the maxillaries; the latter extending to a vertical line passing immediately behind the eye. Two spines of moderate development upon the preopercle. Fins all well developed. Ground color either light or dark brown, marmorated with black.

Sold in the markets under the name of *Sculpin.*

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
315	2	Young.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

12. ASPICOTTUS BISON, Grd.

PLATE XV, fig. 1.—*General Report upon Fishes.*

The posterior extremity of the maxillary extends to a vertical line drawn midway between the posterior edge of the pupil and the posterior rim of the orbit. The scutellæ constituting the lateral line are crowded and vertically elongated. Upper regions dark brown, mottled or blotched with black; beneath dull yellowish, with meandriform dark lines under the head and throat; ventrals uniform yellowish white; other fins mottled yellow and black.

Known as *Sculpin* among the San Franciscans.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
323	1	Adult.	Fort Point, Cal.	1855	Lieut. Trowbridge		Alcoholic.

13. HEMILEPIDOTUS SPINOSUS, Ayres.

General Report upon Fishes.

Upper surface and sides of head provided with membranous flaps; eye quite large; posterior free extremity of maxillary extending to a vertical line drawn at the posterior rim of the pupil. Dorsal band of scales composed of six rows or series; lateral band of seven, five below and two above the lateral line. Ground color dark reddish brown, with darker transverse bands and blotches.

Another *Sculpin,* in the vernacular language of the California settlers.

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List of specimens.

Catalogue number	No. of specimens	Sex and age.	Locality.	When collected.	Collected by—	Original number	Nature of specimens.
326	6	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.
365	1	do	do	1855	Dr. Ayres	33	do

14. ARTEDIUS LATERALIS, Grd.

PLATE XXII*a*, figs. 5 and 6.—*General Report upon Fishes.*

Surface of head smooth. Preopercle armed with a flat bicuspid spine. Band of dorsal scales narrow, originating at the thoracic arch and extending to near the terminus of the base of the second dorsal. Anterior margin of the first dorsal situated in advance of the thoracic arch. Deep chestnut brown above, maculated with yellowish; beneath yellowish.

Too small a fish to have attracted the notice of fishermen.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
366	1	Adult.	San Francisco, Cal.	1855	Dr. Ayres	36	Alcoholic.

15. ARTEDIUS NOTOSPILOTUS, Grd.

PLATE XXII*b*, figs. 5 and 6.—*General Report upon Fishes.*

Surface of head subtuberculous and scaly. Preopercle armed with a flat tricuspid spine. Anterior margin of first dorsal situated in advance of the beginning of the dorsal band of scales, which is broad, and extends from the thoracic arch to near the terminus of the base of the second dorsal. Olivaceous, with a series of saddle-like and black patches; abdomen dull yellow or white.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
367	1	Adult.	San Francisco, Cal.	1855	Dr. Ayres	36	Alcoholic.

IV. FAMILY SCORPAENIDÆ.

16. SEBASTES ROSACEUS, Grd.

PLATE XXI.—*General Report upon Fishes.*

Upper surface of head provided with horizontal and acute ridges; posterior extremity of maxillary extending to a vertical line intersecting the pupil. Origin of dorsal fin situated in advance of the base of the pectorals. Uniform reddish, lighter beneath than above.

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Called *Rock Fish* or *Rock Cod* at San Francisco, and sold under these names in the markets.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
344	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

17. SEBASTES FASCIATUS, Grd.

PLATE XXII.—*General Report upon Fishes.*

Upper surface of head provided with large spinous ridges; posterior extremity of maxillary extending beyond the pupil. Origin of dorsal fin situated in advance of the base of the pectorals. Ground color greenish yellow or sulphur yellow, clouded with dark patches spotted with whitish; a dorsal fasciole of the ground color extends from the third or fourth dorsal spine to the base of the caudal.

Indiscriminately called *Rock Fish* or *Rock Cod* at San Francisco.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
346	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

18. SEBASTES AURICULATUS, Grd.

General Report upon Fishes.

Upper surface of head provided with small horizontal and acute spines; posterior extremity of maxillary extending to a vertical line drawn posteriorly to the orbit. Origin of dorsal fin situated in advance of the base of the pectorals. Blackish brown above, lighter beneath; a black spot upon the upper part of the opercle.

Another *Rock Fish* or *Rock Cod:* all being very much esteemed.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
349	2	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

19. SEBASTES PAUCISPINIS, Ayres.

PLATE XXII*a*, figs. 1–4.—*General Report upon Fishes.*

Head and body very much compressed; former wedge shaped; tip of lower jaw very prominent; spines of the upper surface of skull inconspicuous; posterior extremity of maxillary

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extending to a vertical line drawn posteriorly to the orbit; opercle and preopercle spinous. Origin of dorsal fin a little in advance of the base of the pectorals. Reddish brown above, lighter beneath.

This is a much rarer *Rock Fish* than the preceding ones.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
487	1	Adult.	San Francisco, Cal.	1855	Dr. Ayres	3	Alcoholic.

V. FAMILY GASTEROSTEIDAE.

20. GASTEROSTEUS PLEBEIUS, Grd.

General Report upon Fishes.

Body partly plated; peduncle of tail not keeled. Dorsal spines three, of moderate development, and strongly serrated upon their edges; insertion of anterior one taking place immediately behind the base of the pectorals. Insertion of ventrals placed slightly in advance of the second dorsal spine; ventral spine serrated on both edges, its extremity not reaching the tips of the *ossa innominata*. Posterior margin of caudal subcrescentic.

"Burnstickle" of the English; "Sticklebacks" of the American people.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
331	4	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

21. GASTEROSTEUS SERRATUS, Ayres.

General Report upon Fishes.

Body entirely plated; peduncle of tail keeled. Dorsal spines three; high and slender; conspicuously serrated upon their edges; anterior one inserted a little in advance of the base of the pectorals. Insertion of ventrals situated a little in advance of the second dorsal spine; their own spine being serrated upon both edges, more conspicuously above than below, and extending beyond the tips of the *ossa innominata*. Posterior margin of caudal concave.

Another kind of "Stickleback."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
334	1	Adult.	Bay of San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

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22. GASTEROSTEUS INOPINATUS, Grd.

General Report upon Fishes.

Body partly plated; peduncle of tail consequently not keeled. Dorsal spines three; slender, and slightly serrated upon their edges; insertion of anterior one taking place above the base of the pectorals. Insertion of ventrals placed immediately in advance of the second dorsal spine; ventral spine serrated on both edges, but less conspicuously below than above, and its extremity terminating about evenly with the tips of the *ossa innominata*. Posterior margin of caudal subcrescentic.

Still another "Stickleback."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
337	24	Adult.	Presidio, Cal	1853	Lieut. Trowbridge...	-------	Alcoholic.

VI. FAMILY SCIAENIDAE.

23. LEIOSTOMUS LINEATUS, Ayres.

PLATE XXII*b*, figs. 1–4.—*General Report upon Fishes.*

Mouth large; posterior extremity of maxillary extending to a vertical line intersecting the posterior rim of the pupil. Superior and posterior edge of the opercle terminating into two flat spines. Extremities of pectorals nearly even with the tips of the ventrals. Scales large. Greyish brown above; greyish silvery beneath, with oblique waving lines of umber brown.

The names of *Corvina*, *Cognard*, and *Little Bass* are given to this species by fishermen.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
368	2	Adult..	San Francisco, Cal	1855	Dr. Ayres	5	Alcoholic.
369	2	Young	do	1855	Dr. Newberry	-------	do

VII. FAMILY ATHERINIDAE.

24. ATHERINOPSIS CALIFORNIENSIS, Grd.

PLATE XXII*c*.—*General Report upon Fishes.*

Head small and subquadrangularly pyramidal, constituting the sixth of the entire length. Base of anal fin much longer than that of the second dorsal. Greyish brown above; light brown or silvery beneath. Fins olivaceous, unicolor.

So called *Smelt* by the San Franciscans.

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List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
352	2	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

VIII. FAMILY SCOMBRIDAE.

25. TRACHURUS SYMMETRICUS, Grd.

General Report upon Fishes.

Head forming the fourth of the total length; posterior extremity of maxillary extending to the anterior rim of the orbit. Shields of lateral line smallest upon its bent, under the anterior third of the second dorsal. Greenish brown above, lighter on the sides, silvery beneath; a brownish black blotch at the superior and posterior angle of the opercle; fins unicolor.

There is, as yet, no vernacular name to designate this fish.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
488	1	Adult.	San Francisco, Cal.	1855	Dr. Ayres	26	Alcoholic.

IX. FAMILY BLENIDAE.

26. BLENNIUS GENTILIS, Grd.

PLATE XXV*a*, fig. 4—*General Report upon Fishes.*

A small canine on each side of the upper jaw. A supraorbital membranous flap. A slight depression between the spinous and the soft portions of the dorsal fin. Lateral line terminating under the eleventh spiny ray. Ground color yellowish brown, maculated with purple.

This is a "blenny," unknown to the Californian settlers.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
489	1	Adult.	Monterey, Cal.	1853	Lieut. Trowbridge		Alcoholic.

27. GUNNELLUS ORNATUS, Grd.

PLATE XXV*b*, figs. 6 and 7.—*General Report upon Fishes.*

Dorsal and anal fins contiguous to the caudal; anal spines, two; ventrals reduced to two exceedingly small spines. Head quite small. An occipito-ocular dark vitta continued vertically

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beneath the orbit to the hyoid apparatus. Ground color yellowish; about thirteen dorsal roundish spots of blackish brown, and about eighteen lateral, squarrish ones, of light brown.

The only species of true "Gunnels" as yet known along the coast of California.

List of specimens.

Catalogue number	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
490	1	Adult.	Presidio, Cal.	1853	Lieut. Trowbridge		Alcoholic.

28. APODICHTHYS FLAVIDUS, Grd.

General Report upon Fishes.

Exterior row of maxillary teeth larger than the internal row, which is sometimes rudimentary. Mouth large; posterior extremity of maxillary bone extending to a vertical line drawn posteriorly to the orbit. Origin of dorsal fin situated opposite the base of the pectorals. Caudal fin small. Color uniform greyish yellow; a black fillet extending from the occiput to the upper rim of the orbit, and from beneath the orbit obliquely to the angle of the mouth.

Not noticed by fishermen.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
495	1	Adult.	San Francisco, Cal.	1856	Dr. Ayres	22	Alcoholic.

29. APODICHTHYS VIRESCENS, Ayres.

General Report upon Fishes.

Exterior row of maxillary teeth larger than the internal row. Mouth moderate; posterior extremity of maxillary bone extending to a vertical line drawn within the posterior rim of the orbit. Origin of dorsal fin situated in advance of the base of the pectorals. Caudal fin moderate. Color greenish olive, or bright pea green, maculated with black; a black fillet from the occiput to the upper edge of the eye, and from beneath the eye, obliquely, backwards and downwards, to the angle of the mouth.

Like the preceding species, it has remained unnoticed by fishermen.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
496	2	Adult.	San Francisco, Cal.	1856	Dr. Ayres	22	Alcoholic.

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30. XIPHIDION MUCOSUS, Grd.

General Report upon Fishes.

Three lateral and one abdominal mucous ducts. Head subconical; mouth large; posterior extremity of maxillary bone extending to a vertical line drawn across the posterior rim of the orbit. Ground color olivaceous, clouded or maculated with blackish brown. Two postocular dark vittæ crossing the cheek.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
493	17	Adult & young.	S. Farallones, Cal.	1856	Lieut. Trowbridge		Alcoholic.

31. CEBIDICHTHYS VIOLACEUS, Grd.

PLATE XXV*b*, figs. 4 and 5.—*General Report upon Fishes.*

Upper surface of head narrow, declivous laterally; a fleshy crest along the cranial ridge. Mouth large; posterior extremity of maxillary bone extending to a line drawn across the posterior rim of the orbit. Origin of anal fin situated opposite the anterior margin of the soft dorsal. Ground color uniform brownish violet; an occipito-ocular vitta of deep purplish violet; two other vittæ of the same hue extend—one from the postero-inferior rim of the orbit, the other from the anterior rim—obliquely backwards, across the cheek and opercular apparatus.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
497	1	Adult	San Francisco, Cal.	1856	Dr. Ayres	28	Alcoholic.

32. LUMPENUS ANGUILLARIS, Grd.

PLATE XXV*b*, figs. 1–3.—*General Report upon Fishes.*

Head slender, continuous with the outline of the body; gape of mouth slightly oblique; posterior extremity of maxillary bone extending to a vertical line drawn midway between the anterior rim of the orbit and the pupil. Origin of dorsal fin situated opposite the base of the pectorals. Pectorals and caudal spear-shaped. Greenish olive, upper regions maculated; caudal fin transversally barred.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
507	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.
508	1	do	do	1855	Dr. Ayres	23	do

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33. ANARRHICHTHYS FELIS, Grd.

PLATE XXV*a*, figs. 1–3.—*General Report upon Fishes.*

Profile of head uniformly convex. Eye large and circular. Mouth deeply cleft; posterior extremity of maxillary bone extending to a vertical line drawn across the posterior rim of the orbit. Origin of dorsal fin situated anteriorly to the base of the pectorals. Caudal fin lanceolated; head and body mottled with light ashy grey and dark olive green, disposed in irregular circles, lines, and blotches, which extend also to the dorsal fins.

Might, very properly, be called "Californian Wolf Fish."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
511	3	Young.	San Francisco, Cal.	1856	Dr. Ayres	12	Alcoholic.

X. FAMILY GOBIDAE.

34. GOBIUS LEPIDUS, Grd.

PLATE XXV*a*, figs. 5 and 6.—*General Report upon Fishes.*

Body elongated, slender, and very compressed. Head sub-conical; jaws equal; gape of mouth oblique; posterior extremity of maxillary extending to a vertical line drawn back of the pupil. Interocular space narrow. Reddish brown; fins blackish.

This is one of the "Goby" tribe, heretofore unnoticed.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
362	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

XI. FAMILY CYCLOPTERIDÆ.

35. CYCLOGASTER PULCHELLUS, Grd.

General Report upon Fishes.

Snout bluntly rounded; posterior extremity of maxillary extending to a vertical line drawn in advance of the pupil. Inferior edge of pectoral fins falciform. Origin of dorsal fin placed somewhat posteriorly to the upper edge of the base of the pectorals. Anterior margin of the anal situated nearer the extremity of the snout than the tip of the caudal. Light olive brown above, with longitudinal waving lines of darker brown; abdomen and throat whitish; sides exhibiting white dots.

Improperly called "Sucking Fish."

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List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
519	1	Adult.	San Francisco, Cal.	1855	Dr. Ayres	39	Alcoholic.

XII.—FAMILY OPHIDIDÆ.

36. AMMODYTES PERSONNATUS, Grd.

General Report upon Fishes.

Head constituting about the fifth of the total length; posterior extremity of maxillary extending to the anterior rim of the orbit. Eyes rather large. Origin of dorsal fin situated in advance of the extremities of the pectoral fins; the caudal fin is posteriorly subcrescentic. Color, greyish brown above, silvery beneath; base of caudal black.

A kind of "Sand Launce."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
612	2	Adult.	Cape Flattery, W. T.	1855	Lieut. Trowbridge		Alcoholic.

XIII. FAMILY GADIDÆ.

37. MORRHUA PROXIMA, Grd.

PLATE XL*a*, figs. 5–8.—*General Report upon Fishes.*

Snout subconical, thickish; upper jaw protruding beyond the lower one. Posterior extremity of the maxillary extending to a vertical line, which would intersect the pupil. Dorsal and anal fins all distinct from one another. Anterior anal longer than the second dorsal. Caudal fin posteriorly subtruncated. Color, yellowish-ash or brown above; sides and belly silvery-white.

A true "cod fish," the only one as yet observed in California and Oregon.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
526	5	Adult.	Presidio, Cal.	1853	Lieut. Trowbridge		Alcoholic.
527	5	do	do	1855	Dr. Newberry		do

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38. HOMALOPOMUS TROWBRIDGII, Grd.

PLATE XL*a*, figs. 1–4.—*General Report upon Fishes.*

Snout pointed; mouth deeply cleft; posterior extremity of maxillary extending to a vertical line drawn through the posterior rim of the pupil. Eye large. Second and third dorsals continuous; anal fins continuous also. Extremity of pectorals reaching the anterior margin of the anal fin. Color, greyish-brown bove; silvery-grey beneath.

"California whiting."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
285	1	Adult.	Astoria, O. T.	1856	Lieut. Trowbridge		Alcoholic.

XIV. FAMILY PLEURONECTIDÆ.

39. PLATICHTHYS RUGOSUS, Grd.

General Report upon Fishes.

Eyes moderate, situated on the left side; interocular space moderate. Peduncle of tail long. Origin of dorsal fin corresponding to a vertical line intersecting the middle of the pupil. Scales very rugose and plate like; lateral line slightly arched above the pectoral fins. Left side dark reddish brown; fins olivaceous, dorsal and anal, with alternate vertical bands of black; caudal with longitudinal bands of the same hue; ventrals and pectorals unicolor; right side dull yellow.

This and the following four species belong to the "Flounder" tribe.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
606	5	Adult.	Presidio, Cal.	1853	Lieut. Trowbridge		Alcoholic.

40. PLATICHTHYS UMBROSUS, Grd.

General Report upon Fishes.

Eyes rather large, and situated upon the right side; interocular space narrow. Peduncle of tail short. Origin of dorsal fin corresponding to a line intersecting the anterior rim of the pupil. Scales normal, though some of them are quite rugose; lateral line conspicuously arched above the pectoral fins. Right side uniform blackish brown; left side light brown; dorsal, anal and caudal fin obsoletely maculated.

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List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
607	1	Adult.	Cape Flattery, W. T.	1856	Lieut. Trowbridge		Alcoholic.

41. PAROPHRYS VETULUS, Grd.

General Report upon Fishes.

Body quite elongated and sub-elliptical; peduncle of the tail slender. Posterior extremity of the maxillary extending to a vertical line drawn inwardly to the anterior rim of the orbit. Origin of anal fin placed posteriorly to the base of the pectorals; dorsal and anal fins nearly even posteriorly. Scales minute; lateral line very conspicuous. Color of body and head reddish ash; fins olivaceous, maculated.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
608	1	Adult.	Port Orford	1856	Lieut. Trowbridge		Alcoholic.
609	1	do	Astoria, Oregon	1856	do		do

42. PSETTICHTHYS MELANOSTICTUS, Grd.

General Report upon Fishes.

Body elongated and rather slender. Eyes moderate, situated on the right side; interocular space moderate. Lower jaw somewhat longer than the upper; posterior extremity of the maxillary extending to a vertical line drawn in front of the pupil. Anterior rays of dorsal fin higher than those immediately succeeding; dorsal and anal fins even posteriorly. Origin of anal fin situated somewhat posteriorly to the base of the pectorals, and provided with a small spine. Scales quite small, cycloid in structure; lateral line very slightly raised above the pectorals. Ground color cinereous, interspersed with crowded black dots.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
610	1	Young.	Astoria, Oregon	1856	Lieut. Trowbridge		Alcoholic.

43. PSETTICHTYS SORDIDUS, Grd.

PLATE XL*b*.—*General Report upon Fishes.*

Body elongated and subelliptical. Eyes large, situated on the left side; interocular space very narrow. Jaws nearly even when the mouth is closed; posterior extremity of the maxillary

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extending to a vertical line intersecting the pupil. Anterior rays of dorsal fin gradually increasing in height; dorsal and anal fins nearly even posteriorly; origin of anal situated on a line passing immediately behind the base of the pectorals, and preceded by a very small spine. Scales moderate in size; lateral line almost straight from head to tail. Ground color of a soiled yellow, the scales being margined with black.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
611	4	Adult.	Coast of California	1853	Lieut. Trowbridge		Alcoholic.

XV. FAMILY EMBIOTOCOIDÆ.

44. EMBIOTOCA LINEATA, Grd.

PLATE XXXI and PLATE XXVI, figs. 5 and 6.—*General Report upon Fishes.*

Body subelliptically elongated; anal fin elongated, with its external margin nearly straight, diminishing gradually in depth posteriorly, its origin being situated opposite the sixth articulated ray of the dorsal; tip of pectorals reaching a vertical line intersecting the base of the last but one dorsal spine. Eye of medium size; posterior extremity of maxillary even with the vertical of anterior rim of orbit; frontal region slightly depressed above the eyes; branchiostegals five in number. Sixty two scales in the lateral line. Ground color of upper region dark olive or reddish brown; reddish yellow beneath; sides of abdomen with light longitudinal stripes intersecting the point of union of the rows of scales; anal deep purple, with a yellowish vitta along its base.

This and the following four species belong to the tribe of "viviparous fishes."

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
536	1	Young.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

45. EMBIOTOCA ARGYROSOMA, Grd.

General Report upon Fishes.

General aspect elongated; head rather small, subconical, anteriorly rounded; eye circular and well developed; posterior extremity of maxillary reaching a vertical line drawn in advance of the anterior rim of the orbit. Tip of pectoral fin not extending as far as the anterior articulated rays of the dorsal. About sixty scales in the lateral line. Six branchiostegals. A brilliant r gentine tint over the entire body, though made a little darker along the dorsal region by a greyish or purplish hue; fins olivaceous, unicolor.

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List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
547	2	Adult.	San Francisco, Cal. ------	1856	Lieut. Trowbridge---	--------	Alcoholic.

46. HYSTEROCARPUS TRASKII, Gibbons.

General Report upon Fishes.

Body subelliptical in its profile; nape convex; frontal line depressed; eye circular, of medium size; posterior extremity of maxillary extending to a vertical line drawn in advance of the anterior rim of the orbit. In the male the upper regions are dark or purplish brown, unicolor; yellowish olive, spotted with black, on the lower portion of the flanks; throat and belly golden yellow. In the female the back is ash colored, with irregular black patches, approximating somewhat to interrupted bands across the sides; belly lemon yellow.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
561	1	Adult.	Fort Reading, Cal.-------	----------	Dr. Newberry-------	--------	Alcoholic.
562	2	Young.	--------do----------	----------	Dr. Hammond ------	--------	------do.------

47. HOLCONOTUS RHODOTERUS, Agass.

PLATE XXXV.—*General Report upon Fishes.*

General aspect elongated, neither elliptical nor fusiform. Frontal region subconcave. Head subconical; mouth small; posterior extremity of maxillary not quite reaching the anterior rim of the orbit. Eye rather large and circular. Branchiostegals five. About forty-four scales in the lateral line. Bluish grey or olive above; silvery or yellow upon the sides, with rose colored spots disposed in longitudinal series.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
569	1	Adult.	Astoria, Oregon ---------	1856	Lieut. Trowbridge---	--------	Alcoholic.

48. ENNICHTHYS MEGALOPS, Grd.

PLATE XXXVII.—*General Report upon Fishes.*

General appearance gibbous. Dorsal sheath very short. Mouth large and oblique. Eyes very large, circular. Four rows of scales upon the preopercle. Branchiostegals six. Eighty-

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five scales in lateral line. Ash or greyish brown above. Sides and belly dull yellow or white. A diffused spot upon the anterior third of the anal. Other fins yellowish. Tip of pectorals blackish or deep purple.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
553	1	Adult.	Astoria, Oregon	1856	Lieut. Trowbridge		Alcoholic.

XVI. FAMILY CYPRINIDAE.

49. MYLOCHEILUS CAURINUS, Grd.

PLATE XLVI, figs. 1–4.—*General Report upon Fishes.*

Snout rounded and subconical, though rather blunt. Posterior extremity of maxillary extending to a vertical line drawn across the posterior rim of the nostril. Anterior basal edge of ventrals situated opposite the third developed ray of the dorsal. Brownish black above; yellowish gold beneath; two lateral darker bands, the inferior one extending no further back than the vent.

"Columbia river Dace."

List of specimens.

Catalogue number.	Correspond'g numbers.	No. of specimens.	Sex and age	Locality.	When collected.	Collected by—	Nature of specimens.
213	2770, 2771	12	Adult.	Astoria, Oregon	1855	Lieut. Trowbridge	Alcoholic.

50. MYLOPHARODON ROBUSTUS, Ayres.

PLATE XLVII.—*General Report upon Fishes.*

Upper surface of head very declivous; snout tapering, almost wedge shaped. Posterior extremity of maxillary extending to a vertical line drawn across the anterior rim of the orbit. Eye of medium size. Pectoral and ventral fins broad and stout. Anal fin nearly as large as the dorsal. Ground color olivaceous, darker above than below.

Sold in the markets of San Francisco under the name of "Salmon Trout."

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
244	2796	1	Adult.	San Francisco, Cal.	1855	Dr. Newberry	Alcoholic.

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51. CATOSTOMUS OCCIDENTALIS, Ayres.

General Report upon Fishes.

Eye and mouth of medium size; labial papillæ small and rather inconspicuous. Isthmus very broad. Dorsal fin longer than high. Anterior margin of ventrals corresponding to the middle of the dorsal fin. Posterior extremity of anal reaching the rudimentary rays upon the inferior lobe of the caudal; latter moderately forked. Upper regions of a greyish lead tint; beneath, of a soiled yellow or white.

A true "Sucker."

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
241	2794	2	Adult.	San Francisco, Cal. ------	1855	Dr. Newberry.--	Alcoholic.

52. CATOSTOMUS LABIATUS, Ayres.

General Report upon Fishes.

Eye small; mouth of medium size; labial papillæ conspicuously developed. Dorsal fin higher than long. Pectoral fins quite elongated and well developed. Insertion of ventrals situated opposite the posterior third of the base of the dorsal. The scales are large. Upper regions black; lower half of sides black, clouded upon a yellow ground, whilst the belly and inferior surface of the head are yellow—almost unicolor.

Another true "Sucker," and so called by fishermen.

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
239	2792	1	Adult.	Klamath lake, Oregon.--	1855	Dr. Newberry. --	Alcoholic.

53. ORTHODON MICROLEPIDOTUS, Grd.

PLATE LIII, figs. 1–4.—*General Report upon Fishes.*

Head moderate, its upper surface flattened and declivous towards the snout, which is obtusely wedge shaped. Mouth moderate, broad; posterior extremity of maxillary extending to a vertical line intersecting the nostril. Isthmus very narrow. The anterior margin of the dorsal is placed somewhat in advance of the insertion of the ventrals. Peduncle of tail slender. Ventrals broad. Greyish brown above, whitish or yellowish beneath.

Has no vernacular name, so far as we have heard.

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
206	2764	1	Adult.	San Francisco, Cal. ------	1855	Dr. Newberry---	Alcoholic.

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54. ALGANSEA BICOLOR, Grd.

General Report upon Fishes.

Head, mouth, and eye of moderate size; posterior extremity of maxillary extending to a vertical line drawn across the nostril. The isthmus is narrow. The anterior edge of the insertion of the ventral fins is somewhat in advance of the anterior margin of the dorsal. Scales large. Back and sides of a metallic bluish black tint, intermingled upon the lower half of the flanks with a golden hue; the inferior region is pure white or yellow.

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
192	2750	1	Adult.	Klamath Lake, Oregon	1855	Dr. Newberry	Alcoholic.

55. LAVINIA EXILICAUDA, B. & G.

PLATE LIV, figs. 1–4.—*General Report upon Fishes.*

Body very much compressed, deep upon its middle; peduncle of tail rather slender; head small; eye moderate; posterior extremity of maxillary not reaching the anterior rim of the orbit. Isthmus small. Insertion of ventral fins situated in advance of the anterior margin of the dorsal; pectorals rather small; caudal deeply furcated. Reddish brown above, silvery grey on the sides, the scales being minutely dotted upon their margin; beneath yellowish.

The "Herring" of the California fishermen.

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
209	2766	2	Adult.	San Joaquin river	1855	Dr. Newberry	Alcoholic.

56. TIGOMA BICOLOR, Grd.

General Report upon Fishes.

Body anteriorly compact, diminishing posteriorly; head well developed; mouth large; posterior extremity of maxillary extending to a vertical line drawn between the anterior rim of the eye and the nostril; eye moderate. Origin of ventral fins placed slightly in advance of the anterior margin of the dorsal. Scales large. Dorsal region bluish grey; sides and belly silvery white, sometimes golden.

List of specimens.

Catalogue number.	Correspond'g number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
234	2788	2	Adult.	Klamath Lake, Oregon	1855	Dr. Newberry	Alcoholic.

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57. TIGOMA CRASSA, Grd.

PLATE LXII.—*General Report upon Fishes.*

Body plump and contracted. Head rather small; snout short and rounded; eye small; mouth moderate; posterior extremity of maxillary extending to a vertical line drawn across the posterior rim of the nostril. Pectorals and ventrals small. Scales large. Upper region bluish or purplish black; sides greyish black; beneath yellow.

Known as "chub" amongst the fishermen.

List of specimens.

Catalogue number.	Correspond'g number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
216	2777	1	Adult.	Sacramento river, Cal.	1855	Dr. Newberry	Alcoholic.

58. CHEONDA CÆRULEA, Grd.

General Report upon Fishes.

Body subfusiform in profile. Head of moderate development; snout slender and conical. Mouth rather deeply cleft; posterior extremity of the maxillary extending to a vertical line drawn across the anterior rim of the orbit. Eye rather large. Isthmus narrow. Fins small. Scales moderate. Upper regions of a greyish azure; inferior regions of a dull silvery white; black dots being scattered all over the back, sides, and belly.

List of specimens.

Catalogue number.	Correspond'g number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
237	2790	1	Adult.	Lost River, Oregon	1855	Dr. Newberry.	Alcoholic.

59. PTYCHOCHEILUS OREGONENSIS, Grd.

General Report upon Fishes.

Body subfusiform in profile. Head rather small, elongated, slender upon the snout. Mouth deeply cleft; posterior extremity of the maxillary extending to a vertical line intersecting the anterior rim of the orbit. Eye of moderate development. Pectoral and ventral fins rather small. Back and upper surface of head dark reddish brown; flanks and belly white, with a silvery tint.

List of specimens.

Catalogue number.	Correspond'g number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Nature of specimens.
198	2763	3	Adult.	Willamette river, Oregon.	1855	Dr. Newberry	Alcoholic.

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60. PTYCHOCHEILUS GRANDIS, Grd.

General Report upon Fishes.

Body very much elongated, subfusiform. Head well developed and elongated also. Mouth deeply cleft; posterior extremity of the maxillary extending to a vertical line intersecting the pupil. Eye small. Isthmus very narrow. Fins well developed. Scales moderate. Upper regions olivaceous; flanks and belly silvery or golden.

Sold under the name of "Salmon Trout" at San Francisco.

List of specimens.

Catalogue number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
204	1	Adult.	San Francisco, California	1855	Dr. Newberry		Alcoholic.

XVII. FAMILY SALMONIDÆ.

61. SALMO SCOULERI, Rich.

General Report upon Fishes.

A head is all we have seen of this species, hence it was not deemed expedient to formulate its characters upon such scanty materials. It is called "Ekewan" by the natives of the Columbia river.

List of specimens.

Catalogue number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
613	1	Adult.	Des Chutes river	1855	Mr. Anderson		Dried.

62. FARIO AURORA, Grd.

PLATE LXVIII.—*General Report upon Fishes.*

Body fusiform, compressed. Head forming the fourth of the length, caudal fin excluded. Upper jaw longest. Branch of maxillary gently undulating; its posterior extremity extending to a vertical line passing considerably behind the entire orbit. Anterior margin of dorsal fin equidistant between the tip of the snout and the base of the caudal. Ground color greyish silvery above; sides and belly yellowish orange; dorsal fin spotted.

List of specimens.

Catalogue number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
583	2	Adult.	Astoria, Oregon	1855	Lieut. Trowbridge		Alcoholic.

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63. FARIO ARGYREUS, Grd.

PLATE LXX.—*General Report upon Fishes.*

Body very much compressed, rather deep upon its middle region, and quite tapering posteriorly. Head moderate, constituting the fifth of the entire length. Jaws equal. Maxillary slightly curved; its free extremity extending to a vertical line drawn posteriorly to the orbit. Anterior margin of dorsal fin nearer the extremity of the snout than the insertion of the caudal fin. Bluish grey above; silvery along the middle of the flanks; yellowish beneath.

List of specimens.

Catalogue number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
579	1	Adult.	Cape Flattery, Oregon----	1855	Lieut. Trowbridge---	--------	Alcoholic.

64. FARIO GAIRDNERI, Grd.

PLATE LXXI, figs. 1–4.—*General Report upon Fishes.*

Body fusiform in profile, very compressed. Head comprised four times in the length, the caudal fin excluded. Upper jaw longest; maxillary curved, extending to a vertical line intersecting the posterior rim of the orbit. Anterior margin of dorsal fin equidistant between the extremity of the snout and the base of the caudal. Caudal fin forked. Back silvery grey; sides silvery, and belly yellowish white. Body obsoletely spotted with black; similar black spots may be seen on the dorsal and caudal fins.

List of specimens.

Catalogue number.	Number of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
578	1	Adult.	Klamath river ----------	1855	Dr. Newberry-------	--------	Alcoholic.

65. FARIO STELLATUS, Grd.

PLATE LXIX, figs. 5–8.—*General Report upon Fishes.*

Body elongated and fusiform. Head well developed, contained four times and three-quarters in the total length. Jaws equal. Maxillary gently curved, reaching a vertical line drawn posteriorly to the orbit. Anterior margin of dorsal fin a little nearer to the extremity of the snout than the insertion of the caudal. Back light olive; belly light yellowish white; head, body, and fins, profusely spotted with black.

The "salmon trout" of the Oregon settlers.

List of specimens.

Catalogue number.	No. of specimens	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
591	2	Adult.	Upper Des Chutes river---	1855	Dr. Newberry-------	--------	Alcoholic.

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66. SALAR IRIDEA, Grd.

PLATE LXXIV.—*General Report upon Fishes.*

Body subfusiform in profile, otherwise compressed. Head well developed, constituting somewhat less than the fourth of the total length. Jaws subequal, posterior extremity of maxillary extending to a vertical line drawn a little beyond the orbit. Anterior margin of dorsal fin equidistant between the extremity of the snout and the insertion of the caudal. Reddish brown above, with numerous and small black spots; yellowish white beneath.

The "brook trout" of California.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
594	1	Adult.	Chico creek, Cal	1855	Dr. Newberry		Alcoholic.
595	2	do	San Francisco, Cal	1855	Dr. Ayres	27	do

67. ARGENTINA PRETIOSA, Grd.

PLATE LXXV, fig. 5.—*General Report upon Fishes.*

Posterior extremity of maxillary extending to a vertical line drawn in advance of the pupil. Eye large and circular, its diameter being contained about four times in the length of the side of the head. Origin of dorsal fin somewhat nearer the extremity of the snout than the tip of the caudal fin, which is forked. The adipose is situated opposite the posterior fourth of the anal. The origin of the ventrals is placed somewhat behind a vertical line drawn at the anterior margin of the dorsal fin. Scales of moderate development. Upper surface of head and back yellowish. Outlines of scales dotted with black. Sides of head and middle of flanks of a shining silvery tint. Lower half of flanks and belly dull yellowish.

One of the genuine "smelt" tribe.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
604	2	Adult.	San Francisco, Cal.	1855	Dr. Newberry		Alcoholic.

68. COREGONUS WILLIAMSONI, Grd.

PLATE LXVI.—*General Report upon Fishes.*

Head and mouth small; posterior extremity of the maxillary not extending as far as the anterior rim of the orbit. Scales large, disposed upon eighteen longitudinal series upon the line of greatest depth, nine above and eight below the lateral line, which is perfectly straight. Color silvery white, with a bluish grey tint over the dorsal region.

Williamson's white fish.

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List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
601	2	Adult.	Des Chutes river, O. T---	1855	Dr. Newberry-------	--------	Alcoholic.

69. ACIPENSER ACUTIROSTRIS, Ayres.

Body subfusiform. Head slender and depressed; snout tapering and acute. Eleven dorsal shields from the occiput to the anterior margin of the dorsal fin; twenty-seven shields in the lateral series, and nine between the pectorals and the ventral fins. Greyish black above; yellowish white beneath.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original number.	Nature of specimens.
614	1	Adult.	San Francisco, Cal. -----	1855	Dr. Newberry-------	--------	Alcoholic.

70. ACIPENSER MEDIROSTRIS, Ayres.

Body fusiform. Head stoutish; snout rounded anteriorly, and abbreviated. Eleven dorsal shields from the occiput to the anterior margin of the dorsal fin; thirty-seven shields in the lateral series, and nine between the pectorals and ventral fins. Reddish brown above; yellowish beneath.

List of specimens.

Catalogue number.	No. of specimens.	Sex and age.	Locality.	When collected.	Collected by—	Original umber.	Nature of specimens.
615	1	Adult.	San Francisco, Cal. -----	1855	Dr. Newberry-------	--------	Alcoholic.

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No. 2.

REPORT UPON THE ZOOLOGY OF THE ROUTE.

BY J. S. NEWBERRY, M. D.*

CHAPTER I.

REPORT UPON THE MAMMALS.

SOREX VAGRANS, Cooper.

BAIRD, General Report Mammals, 1857, 15.

SP. CH.—Ears moderately large, though little more than half as long as the adjacent fur. Fur rather full and long, hairs on the back measuring 2½ lines. Tail longer than the body alone, about five-sixths as long as head and body together, scantily haired at tip. Third lateral tooth above smaller than fourth. Anterior upper incisor with a rounded internal lobe in broad contact with its fellow. Color above, olive brown, varied with hoary; beneath, dusky yellowish white; sides a little paler than the back. Head and body ten inches. Tail 1⅔. Hind foot about .47 of an inch.

A single specimen, probably belonging to this species, was taken in the Cascade mountains.

SOREX SUCKLEYI, Baird.

BAIRD, General Report Mammals, 1857, 18.

SP. CH.—Ears quite large, about as long as the adjacent fur. Longest hairs measuring barely two lines. Feet rather small. Tail considerably longer than the body, exclusive of head; well coated with hair. Caudal vertebræ 16. Third lateral tooth above smaller than the fourth. Width of skull rather more than half its length. Length of palate three-eighths this length. Color above, light chestnut brown; beneath, grayish white. Length 2¼ inches. Tail 1½? Hind foot .46 of an inch.

One specimen of this species was collected on the Upper Des Chutes river, in Oregon.

SCALOPS (SCAPANUS) TOWNSENDII.

Oregon Mole.

BAIRD, General Report Mammals, 1857, 68.

SP. CH.—Teeth 44. Eye small, but not covered by the integument. Tail rather scantily haired. Nostrils opening on the upper surface of the tip of the snout. Palm large and broad. Color nearly black, with faint purplish or sooty brown reflections. (Sometimes, perhaps, glossed with silvery?) Length six to seven inches.

Specimens of this species were collected at San Francisco.

* The species enumerated in this report have been determined, and their diagnoses prepared, by Prof. S. F. Baird, Assistant Secretary of the Smithsonian Institution.

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FELIS CONCOLOR, Linn.

The American Panther.

Felis concolor, Linn. Mantissa, 1771, 522; pl. ii.
Baird, Gen. Report Mammals, 1857, 83.

Sp. Ch.—Body considerably larger than that of the common sheep. Tail more than half the length of head and body. General color above, a uniform pale brownish-yellow, finely mottled by dark tips to all the hairs. Beneath, dirty white A black patch on the upper lip, separated from the nose by a triangular white space. Convexity of ear black; tip of tail dusky. No spots or blotches on the body in the adult; a few obsolete ones in the half-grown young. Kittens with the body densely spotted and the tail ringed.

The cougar is perhaps as common in California and Oregon as east of the mountains, and is essentially the same animal. The specimens I saw varied considerably in color, but otherwise there seemed to be no difference. A cougar which I saw and attempted to shoot, on Pit river, was of a bright yellowish-red, much like that of the summer coat of the Virginia deer; while a large and beautiful one, kept caged in San Francisco, was of a light mouse-color, scarcely tinged with red.

This animal was entirely untameable, manifesting to his keeper, as well as to strangers, unmitigated ferocity; he was, however, as I believe all cougars are, very cowardly. The one I saw on Pit river ran from us, and took refuge in a cliff of volcanic rock; exhibiting as much timidity as a hare.

We saw their tracks nearly every day of our march, but only on one other occasion the animal. A very large one was seen by a soldier, cautiously following the trail of our guide, who had passed a short time before; he was following by scent like a dog.

LYNX RUFUS.

American Wild Cat.

Felis ruffa, Guldenstaedt, Nov. Comm. Petrop, XX, 1776, 499.
Felis rufa, Schreber, Säugt. III. 1778, 412; pl. cix A (*Rothluchs* in text.)
Lynx rufus, Raf. Am. Month. Mag. II, 1817, 46.
Aud. & Bach. N. A. Quad. I, 1849, 2; pl i.
Baird, Gen. Rep. Mammals, 1857, 90.

Sp. Ch.—Fur moderately full and soft. Above and on sides pale rufous, overlaid with greyish; the latter color most prevalent in winter. A few obsolete dark spots on the sides and indistinct longitudinal lines along the middle of the back. Collar on the throat like sides, but much paler. Beneath, white spotted. Inside of fore and hind legs banded. Tail with a small black patch above at the end, with indistinct subterminal half rings. Inner surface of ear black, with a white patch.

The wild cat is a very common animal in California and Oregon, and was killed or seen by our party in a number of different and distant localities. In the immediate vicinity of San Francisco, California, on the shores of San Francisco and San Pablo bays, wild cats abound, frequenting the shore and subsisting on fish or water fowl. While shooting ducks and other water birds about Benicia I several times saw them. At one time, while in a small boat floating quietly along shore, in the straits of Carquines, on rounding a point we came suddenly upon a lynx, which was walking along the beach picking up his breakfast. We were within twenty yards of him, and the first intimation which he received of our presence was a full charge of bird shot in the face and eyes. He seemed very much surprised at the salute, springing suddenly four or five feet into the air, and then with surprising agility scrambling up the almost perpendicular face of the rocky wall bordering the straits, and before I could seize another gun, lying in the bottom of the boat, he had disappeared in the bushes.

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At Yreka a fine specimen was killed by a member of our party, and in the Klamath lake basin the Indians had large numbers of their skins, of which the squaws make their robes. We found it quite up to the Columbia, but on that river, and especially thence northward, it is mostly replaced by the larger species, *Lynx fasciatus*.

LYNX FASCIATUS, Raf.

Red Cat.

Lynx fasciatus, Raf. Am. Monthly Mag. II, 1817, 46.
Baird, Gen. Rep. Mammals, 1857, 96.

Sp. Ch.—Fur very soft and full. Ears pencilled. Color, rich chestnut brown on the back, a little paler on the sides and on the throat. A dorsal darker band and collar on throat, as dark as the sides. Region along central line of belly, (rather narrow one,) dull whitish, with dusky spots extending to lower part of sides. No spots or bands discernible on the upper part of sides. Ears black inside, with a very inconspicuous patch of greyish. Terminal third of tail above, black.

In the region traversed by our party, south of the Columbia river, we hardly entered the range of this large lynx. We saw but a single individual, and that one was not killed.

The banded lynx, like the Canada lynx, (*L. canadensis*,) though a large and powerful animal, is cowardly, and has never been known to attack man. It is more boreal than the red lynx, and exists from the vicinity of the Columbia to a considerable distance beyond the British line. His subsistence is made up of all the smaller animals inhabiting the region where he is found, together with birds and fish when he can catch them. He is supposed by the hunters and Indians sometimes to kill the deer unaided, but this wants confirmation.

CANIS OCCIDENTALIS var. GRISEO-ALBUS.

Gray Wolf.

Baird, General Report Mammals, 1857, 104.

Though much less common than the "coyote," the large grey wolf is found in all the uninhabited parts of California and Oregon. Very few were seen by members of our party, none were killed, and we had everywhere evidence that this species is much less numerously represented on the Pacific coast than on the Upper Missouri. In the Cascade mountains we saw tracks of some of these wolves of most portentous size. All the large wolves seen by any of our party were grey, and all the skins which I saw in the possession of Indians or whites were also grey, and it is probable that the white and black varieties are never found in California. On the upper Columbia, in Oregon and Washington Territories, where the wolves are more numerous and the winters are colder, the same variations occur which are common on the upper Missouri.

CANIS LATRANS, Say.

Prairie Wolf: Coyote.

Canis latrans, Baird, Gen. Rep. Mammals, 1857, 113.

The prairie wolf is exceedingly common in all the open country of California and Oregon. In the wooded districts it is less abundant, but on almost every night of our march we were serenaded by its melancholy, wailing cry.

The sage plains bordering the Klamath lakes and in the Des Chutes basin, surfaces for the most part destitute of trees and covered with clumps of artemisia, are inhabited by considerable numbers of rabbits and hares, particularly *L. artemisiæ* and *L. campestris*. These animals form some portion of the subsistence of the coyotes, which are there very numerous. While encamped

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there we often heard them at night hunting in packs, and yelping in chorus, apparently by their numbers surrounding, and by their cries confusing, their prey.

During the summer the coyotes subsist in a great degree on grasshoppers, and we frequently saw them engaged in catching these insects. This they effect by springing with great quickness and bringing the fore paw down on them. They eat also mice, lizards, and frogs, and resemble so much in their diet, and in their timid, sneaking, thievish nature, the Digger Indian, that the hunters put them on an equality, and consider them in some way related to each, or at least make them equal objects of contempt and detestation. To call the "Digger" a dog, is, in the hunter's estimation, to elevate him; to compare him with a coyote is to degrade; one scarcely knows which.

If one can content himself with so ignoble game, the coyote hunted on horseback affords very good sport.

While our party was crossing from Hamilton, on Feather river, to the Sacramento, Mr. Anderson and myself took a wide sweep to the right of the trail in hope to get a shot at an antelope or deer. We saw no game whatever, except coyotes, if, indeed, they can be called game; and my companion, a keen sportsman who had often hunted the large wolf on the prairies of Texas, proposed that we should have a steeple chase. I assented, and we were soon racing over the prairie, each in chase of a wolf, at a speed that brought them ere long under our horses' feet. We found considerable difference in the speed of different individuals; but, generally, they are readily overhauled by a good horse, and, by a shot from the saddle, may be killed without difficulty.

The color of the coyote, in most localities, is a light brownish yellow, with a very few black hairs along the back; we saw, however, in the Des Chutes basin, some which were larger and darker, as was the skin of one from Yreka, which I brought home.

We several times saw large numbers of burrows, about the size of those of the badger, closely set together, and occupying, perhaps, a quarter or half acre. These had evidently been formed by an animal of considerable size which seemed to have abandoned them entirely. Bartie, our guide, informed me that these were the breeding places of the coyotes, where the females go, at certain seasons, to bring forth their young. How true this may be, I cannot say; but the coyote seemed the only animal inhabiting the country in sufficient numbers to form such colonies.

The cry of the prairie wolf is precisely that of the Indian dog of the west—a sharp bark, followed by a succession of yelps running into each other, and ending in a long-drawn quavering howl, at times indescribably melancholy. While camping on a tributary of Pit river, in a region infested with hostile Indians, I was one evening fishing for trout alone, a mile or more from camp, and, detained by the fascination of unusually good sport, I still lingered till the stars began to appear, when a coyote, coming to the top of a ledge of trap rock on the opposite side of the stream, favored me with a succession of howls so mournful and sinister that I was fain to look upon it as an evil omen, and gathering up my fish and groping my way back to camp was quite disposed to congratulate myself on arriving there without adventure.

VULPES MACROURUS, Baird.

Great Tailed Fox.

BAIRD, General Report Mammals, 1857, 130.

The red fox inhabits all parts of Oregon and California, but I suspect is less abundant in the central and southern portions of California than further north. At least we met with the

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living animals, as well as the skins prepared by the Indians, in much greater numbers about the Klamath lakes, and in the Des Chutes basin, than in California.

In this region the red fox exhibits all the varieties which have been noticed in the eastern States; the typical red fox, with more or less of black on back, head, and feet; the black, the cross, the silver grey, all are well known to the hunters, who assert that they have found all these varieties in the same litter. The silver grey has long been, with the exception of the sea otter, the most valuable fur obtained by the Hudson Bay Fur Company; good skins formerly commanding from twenty-five to thirty dollars, and fine *pairs* of skins even much more than this. Now, they, in common with all peltries, have suffered a considerable decline in price.

I obtained a fine specimen of the silver fox at our depot camp on the upper Des Chutes river. He was killed by a soldier, who had given him the benefit of his musket load, a ball and three buckshot, when close upon him, by which the poor animal's existence was evidently brought to a sudden close.

VULPES VELOX.

Kit Fox.

BAIRD, General Report Mammals, 1857, 133.

The "swift fox," *lucus a non lucendo*, is another member of the group of animals whose peculiar habitat is the dry, desert-like country lying on either side of the Rocky mountains, extending to the Cascade range on the west, and to the timbered lands of the lower Missouri on the east. In the basin of the upper Columbia it is more common than any other species, and I saw, while in that vicinity, a great number of the skins obtained by the hunters and Indians. We had no opportunity of observing the animal except in confinement, nor of testing, by actual experiment, the truth of the report which gives to this small, short-limbed fox such fabulous speed. All those, however, who were familiar with them, as found on the prairie, agreed in saying that its swiftness has been greatly overrated; that it is even less swift than its congeners, the red and grey foxes; all of which the appearance and structure of the animal fully confirm.

The home of this species is evidently the dry, sterile, almost treeless region, which I have mentioned above. We found no traces of it to the westward of the Cascade range in Oregon, or in any part of California.

VULPES (UROCYON) VIRGINIANUS.

Gray Fox.

Canis virginianus, ERXLEBEN, Systema Regni-Animalis, 1777, 567 (from Catesby.)
Vulpes virginianus, DEKAY, N. Y. Zool. I, 1842, 45; pl. vii, f. 2.
AUD. & BACH. N. A. Quad. I, 1849, 162; pl. xxi.
BAIRD, Gen. Rep. Mammals, 1857, 138.

SP. CH.—Head and body a little over two feet in length. Tail rather more than half as long. Tail with a concealed mane of stiff bristly hairs. Prevailing color mixed hoary and black; convexity and base of ears, sides of neck, edge of belly, and considerable portion of fore legs rusty or cinnamon. Band encircling the muzzle, much dilated on the chin, black. Throat and lower half of face pure white. Tail hoary on the sides; a distinct stripe above and the tip black; rusty beneath.

In Ohio, Kentucky, and Michigan, the most densely wooded of the middle States, the pioneer settler found only the grey fox, or at least that species occupied the territory so nearly exclusively that they considered any others as, like themselves, interlopers. As the forest gradually fell before the axe of the woodman, and broad and continuous stretches of waving grain replaced the thickly set trunks of oak, ash, and hickory, the grey fox became gradually more rare,

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while the swifter, stronger, and more cunning red fox by degrees almost entirely usurped its place. Hence the farmers supposed they had themselves introduced this farm yard pest, and that it had been the companion of their migration from the east; and, as it was then confounded with the common fox of Europe, (*V. vulgaris*,) it was supposed to be an importation, which ultimately would drive off its weaker relative and possess the continent.

Since, however, the red fox has been found in various places in the far west, and spread over all the region west of the Rocky mountains, and the red fox of America has been pronounced different from the red fox of Europe, this theory falls to the ground, and we must look for some other cause to account for the usurpation of the habitat of the gray fox by the red.

The grey fox is evidently best fitted by nature for the occupation of a wooded country; he even has, to a certain degree, the power of climbing trees, not possessed by *Vulpes fulvus*, while he rarely or never forms burrows, having no cover but such as the forest furnishes, and thus is comparatively unprotected in an open country, where the red fox would be quite at home. To these differences of habit, rather than to any other cause, I would attribute the change of distribution noticed in the two species.

In California and Oregon the gray fox is quite common, at least in the wooded portions. Of the several specimens obtained from there, none present any marked differences from the gray fox of the eastern States.

One specimen was collected in Napa valley.

VULPES (UROCYON) LITTORALIS, Baird.

Coast Fox; Short-Tailed Fox.

BAIRD, Gen. Rep. Mammals, 1857, 143.

SP. CH.—Scarcely more than half the size of the common grey fox (*Vulpes virginianus*). Tail one-third the length of body. Above, hoary and black; sides of neck, fore legs, and lower part of sides, dull cinnamon; chin and sides of muzzle black. Tail with a concealed mane of stiff hairs, and with a black stripe above.

This species was first discovered on the Island of San Miguel, off the California coast, by Lieut. Trowbridge, United States army. His attention was first called to it by its familiarity and fearlessness, its small size, and remarkably short tail. On setting a trap, one was immediately taken, and for some days kept in confinement; he escaped, however, and the next night was retaken in the same trap which had first secured him, being identified by the leather strap which remained on his neck. The same thing occurred several times in immediate succession, the fox evincing a total want of the vulpine cunning which so generally sets at defiance the trapper's art. A number of specimens were obtained by Lieutenant Trowbridge, and, after careful examination, Professor Baird has determined it to be distinct from any species hitherto known. The colors of the animal are, in general, those of the gray fox, from which it differs in size, length of tail, in habit, and in certain osteological characters, which are fully set forth in the specific description given by Professor Baird.

So far as known, it inhabits exclusively the island of San Miguel.

BASSARIS ASTUTA.

Civet Cat.

BAIRD, Gen. Rep. Mammals, 1857, 147.

This beautiful animal, which, at the time Audubon's description was written, was supposed to be peculiar to Texas and Mexico, has since been found somewhat abundantly in California.

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The district in which it occurs, if not exclusively, certainly most abundantly, is that including the foot hills of the Sierra Nevada, on the eastern side of the great trough of the San Joaquin and Sacramento. In this half wooded region, the home of the gold hunter, it is well known, and apparently has much the character given by Audubon to the same animal in Texas. The miner calls it the "mountain cat;" it frequently enters his tent and plunders his provision bag. When caught, as it often is, it becomes so familiar and amusing, and does so much to relieve the monotony of the miner's life, that it is highly valued, and commands quite a large price.

The bassaris is, perhaps, equally efficient as a mouser with the common cat; is much more playful, and to a large number of the members of every community who are *cat haters* might be a desirable substitute.

MUSTELA AMERICANA, Turton.

American Sable; Pine Marten.

Mustela americanus, Turton's Linnæus, I, 1806, 60.
Baird, Gen. Rep. Mammals, 1857, 152.
Mustela martes, Jos. Sabine, Zool. App. to Narr. Franklin's Journey, 1823, 651.
Aud. & Bach. N. A. Quad. III, 1853, 176; pl. cxxxviii, (L. Huron.)

Sp. Ch.—Legs and tail blackish. General color reddish yellow, clouded with black; above becoming lighter towards the head, which is sometimes white. A broad yellowish patch on the throat, widening below so as to touch the legs. Central line of belly sometimes yellowish. Tail vertebræ about one-third the head and body. Outstretched hind feet reach about to the middle of the tail with the hairs. Feet densely furred.

We obtained two specimens of the pine marten on the head waters of the Des Chutes river, in Oregon. They were in a small pine tree; one was shot, and the other killed by a blow with a club as he descended. From the Indians, and from the officers of the Hudson's Bay Company, I learned that the animal is not uncommon in Oregon and Washington Territories, and that considerable numbers of their skins are annually brought in by the hunters. In California it would seem to be more rare, as we saw and heard nothing of it while on our march. Bartee told me, however, that he had on one occasion met with it while mining gold on Yuba river, in that State. The miners were in great want of food, their supply of provisions having failed, in which emergency Bartee had started out with his rifle in search of game. He found nothing to shoot, however, but three pine martens, all in one tree, two of which he killed, the third escaping. When taken into camp, skinned and cooked, the half starved miners tried to eat them, but they proved so tough and unsavory that they were thrown away in disgust.

MUSTELA PENNANTII, Erxl.

Fisher; Black Cat.

Baird, Gen. Rep. Mammals, 1857, 149.

We did not meet with the fisher living, but saw many skins of individuals which had been killed in Washington and Oregon Territories.

It is very rare in Oregon, more common in Washington Territory and in the British provinces, but nowhere at the west abundant.

At the Klamath lakes we found the natives using quivers for their arrows made from the skin of the fisher. I saw but one or two of these skins, however, most of those in possession of the Indians being of lynx, otter, raccoon, wolf, dog, &c.

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PUTORIUS XANTHOGENYS.

Yellow Cheeked Weasel.

Mustela xanthogenys, GRAY, Ann. and Mag. N. H. XI, 1843, 118.—IB. Zool. Sulphur, 1844, 31; pl. ix.
Putorius xanthogenys, BAIRD, Gen. Rep. Mammals, 1857, 176.

SP, CH.—Similar to *P. frenatus*. Tail vertebræ about half the length of the body; the hairs about one-eighth this length. Head chesnut brown, little darker than the back; the three patches on the face reddish yellow; body chesnut brown above, reddish white beneath; tip of tail black.

About San Francisco this small species is very common and well known to the residents. I supposed it to be the bridled weasel (*P. frenata*) when I obtained it, especially as I knew that species to be common in northern Mexico. It is, however, apparently distinct, being much lighter about the head. It varies, however, very much in color at San Francisco, some individuals being much darker than others, and closely approaching the Mexican species.

The habits of *P. xanthogenys* are precisely those of the common eastern weasel, and they are reported to be as busily employed in the destruction of rats about San Francisco as weasels are with us.

Our specimens were obtained in the San Francisco market.

PUTORIUS VISON.

Common Mink.

Mustela vison, BRISSON, Quad. 1756, 256.
Putorius vison, AUD. & BACH. IV, An. Quad. I, 1849, 250; pl. xi, f. 1.
BAIRD, Gen. Rep. Mammals, 1857, 177.

SP. CH.—Tail about half as long as the body. General color dark brownish chesnut; tail nearly black; end of chin white, but not the edge of upper jaw.

I obtained specimens of the mink from Klamath lake, and it was seen again by our party in the Des Chutes river. It is found in all parts of Oregon, and probably of California, though certainly less abundantly in the last mentioned State. The specimens obtained from Klamath lake were not as dark as the handsomest skins I have seen from the British provinces; they were, however, killed in August, and for the season the fur was very fine and thick.

Mr. McTavish, the intelligent factor of the Hudson Bay Company at Vancouver—from whom I received much valuable information relative to the numbers and distribution, as well as to the habits of the fur-producing animals of the northwest—told me that the company obtain large numbers of mink skins from Washington and Oregon, and that it is the most valuable of all the more common furs. The price now paid to the hunters is the same for a mink skin as for that of a beaver; but to the trader the mink skin is much the most valuable, the beaver skins being hardly worth the price of transport.

LUTRA CALIFORNICA, Gray.

California Otter.

Lutra californica, GRAY, Charlesworth's Mag. N. H. I, 1837, 580.
BAIRD, Gen. Rep. Mammals, 1857, 187.

SP. CH.—Naked muffle wider than long; under surfaces of feet scarcely hairy; the naked terminal pads not isolated from the other bare portion by hair.

The otter and beaver are generally regarded by those who have given the matter no special attention as closely allied animals, and are supposed to have precisely the same habits and

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habitats; whereas they belong to different orders, and are nearly as widely separated as mammiferous quadrupeds can well be. The beaver is a rodent, and the type of the order, the marmot, hare, and squirrel being his congeners. His food is exclusively vegetable, and he inhabits the banks of running streams because water affords him the means of protection and locomotion, not because it furnishes him with food. With the exception of his great incisors, which are fitted for cutting wood alone, his teeth are all grinders, and more perfectly such than the teeth of herbivorous ruminants. In disposition he is mild and inoffensive, and it is but with difficulty he can be induced, even in self defence, to use his dental chisels. On the contrary, the otter is exclusively carnivorous, living on fish, and never on vegetable food; he swims and dives with even greater facility than the beaver, and less often inhabits small running streams than rivers and lakes. He has the dentition and the disposition of the carnivora, and will defend himself stoutly against any animal which may attack him.

The otter exists on all parts of the Pacific coast, both on the sea shore and in the inland streams and lakes. In the Cascade mountains, where neither otter nor beaver had been much hunted, and where both were abundant, we found the beaver in the streams, but the otter in great abundance in the mountain lakes where these streams take their rise. There they subsist on the western brook-trouts and a *Coregonus* with a crayfish, *Astacus klamathensis*. These fish are exceedingly active, and an otter must be very swift to catch them. I brought a fine specimen from this locality which measured five feet from the extremity of the nose to the tip of the tail. His skin was very beautiful, and when in the water the hair over all the surface was beautifully iridescent.

In the Klamath lakes the otter is quite common, and several of their skins were procured by our party from the Indians. In these lakes their food is a large sucker (*Catostomus occidentalis*) and a species of *Gila*, both rather sluggish fishes, and such as would be easily caught.

At the present time the fur of the otter is much more in demand than that of the beaver. When I was at Vancouver the prices paid in goods to the hunters by the Hudson Bay Company were for beaver skins 50 cents, for otter $2 50 each.

The western otter has been described by Gray under the name of *Lutra californica;* the otter of the eastern States, long since called by Sabine *L. canadensis*, he seems not to have seen. The most conspicuous difference between the eastern and western otters is the greater amount of hair on the palms and soles of those from the west. Since, however, this difference is so slight, and the otter is found quite across the continent without break or interval in the series, I am inclined to consider them as all specifically identical, though presenting several shades of variation. On the Upper Missouri, where the stream is muddy and not well supplied with fish, the otters are few in number, small in size, and the fur pale and inferior.

Our specimen of this species was collected in the Cascade mountains, about 160 miles south of the Columbia.

ENHYDRA MARINA, Fleming.

Sea Otter.

BAIRD, Gen. Rep. Mammals, 1857, 189.

Of this little known but interesting animal we had no opportunity of obtaining fresh specimens, and but little information which was satisfactory. From Mr. McTavish I learned that it is occasionally taken on the coast of Oregon and Washington Territories, but not more than two skins are usually obtained by the Hudson Bay Company, at that point, in a year. Further

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down the coast they are more abundant, and the capture of the sea otter off southern California employs quite a number of men and several boats. I saw, in San Francisco, a number (one hundred or more) of their skins, some of enormous size and great beauty. The largest were full six feet long, and had evidently once belonged to animals considerably larger than those upon which descriptions have been based. This lot of skins was offered us at thirty dollars each; less than half the price they formerly bore.

A curious fact, as illustrative of the aquatic habit of the sea otter, was related by one of the hunters. He said he had seen the female with very small young at sea, forty miles from shore, but that generally they are found on soundings, and particularly where the gigantic kelp (*Macrocystis*) raises its cable-like stem, and expands its broad leaf on the surface of the water. After the seal this animal is undoubtedly the most aquatic of the carnivorous mammalia.

MEPHITIS OCCIDENTALIS, Baird.

California Skunk.

Mephitis occidentalis, BAIRD, Gen. Rep. 1857, 194.
? *Mephitis mesomelas*, ST. HILAIRE, Voy. de la Venus, Zoologie, I, 1855, 133; plate.

SP. CH.—Size of a cat. Tail vertebræ two-thirds the length of head and body, Bony palate with small narrow emargination in the middle of its posterior edge. Color black, with a white nuchal patch, bifurcating behind and reaching to the tail, which is entirely black.

Aside from the little zorilla, one or more species of a larger size inhabit California. *M. bicolor*, as I have said in speaking of that species, inhabits the more southern portions of the State, where it is associated with at least one larger species. North of Benicia skunks are not unknown, as we had both ocular and nasal evidence, for it not unfrequently happened, as on our march we dipped down with our train into some quiet valley, that the breath of evening or early morning would come to us freighted with the odors characteristic of the genus. I saw several of these animals which had been killed, but they were so much decomposed as to render their identification difficult if not impossible.

MEPHITIS BICOLOR.

Little Striped Skunk.

Mephitis bicolor, J. E. GRAY, Charlesworth's Mag. N. H. I, 1837, 581.
Mephitis zorilla, LICHTENSTEIN.
AUD. & BACH. N. Am. Quad. III, 1854, 276, (not figured.
BAIRD, Gen. Rep. Mammals, 1857, 197.

SP. CH.—Smallest of North American species. Tail vertebræ less than half the body; with the hairs, not much more than half. Black, with a broad white patch on forehead, and crescent before each ear; four parallel dorsal stripes interrupted and broken behind; a shorter stripe on side of belly, running into a posterior transverse crescent, which are white. Tail black throughout to base of hairs, except a pure white pencil at the end.

This elegant little skunk, so handsomely marked and clothed in a coat so soft and silken, presents, in all but the most striking characteristics of the genus, a marked contrast to the larger species so common in the eastern States, (*M. chinga.*)

It is a southern species, of the range of which San Francisco is probably about the northern limit. From San Francisco southward it becomes more common, extending quite into Mexico, and probably across the continent into Texas.

This animal is so prettily marked, that, on looking over our collections, even ladies, ignorant

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of its name, have not failed to admire it; and, indeed, the same thing has occurred in reference to the larger species, (*M. chinga* and *M. mesoleuca.*) If we were divested of certain prejudices, and these animals of certain perfumes, it is probable we should regard them, as they certainly deserve, as very handsome creatures.

To any collector in zoology who may happen to have, as an idiosyncracy, a dislike of some odors, it may be useful to know that there are several ways of taking skunks without causing them to emit their perfume. The best way is to catch the animal in a box trap, and to plunge the trap unopened into water, by that means drowning the skunk. If killed suddenly *very dead* by a rifle ball or shot, they are inodorous. Another mode sometimes practised, and *sometimes* successful, is to attack the skunk with a small dog, and while his attention is engaged, to walk boldly up, and seizing him by the tail, raise him instantly into the air, when he may be despatched by blows on the head, his system of defence in such circumstances being inoperative.

TAXIDEA AMERICANA.

American Badger.

Ursus taxus, SCHREBER, Säugt. III, 1778, 520, fig. 142, B. (From Buffon.)
Meles taxus, var. *β americanus*, BODDAERT, Elenchus Anim. I, 1784, 136.
Meles americanus, ("BODD.") ZIMMERMANN, Pennant's Arktische Zoologie I, 1787, 74.
Taxidea americana, BAIRD, Gen. Rep. Mammals, 1857, 202.
Ursus labradorius, GM. Syst. Nat. 1, 1788, 102.
KERR's Linnæus, 1792, 187.
SHAW, Gen. Zool. Mamm. I, 1800, 469; pl. cvi.
Meles labradoria, MEYER, Zool. Archiv. II, 1796, 45.
AUD. & BACH N. A. Quad. I, 1849, 360; pl. xlvii.

SP. CH.—Head grizzled grey, black on the end of snout and along the eyes. A median white line from near the nose to the nape. Legs and a crescentic patch before the ears black. Cheeks and under parts generally white.

In traversing the arid surfaces of the sage plains of eastern California, Utah, and Oregon, there is, perhaps, no one thing which the traveller may be more sure of seeing every day of his journey than the burrow of a badger; and, after cursing the country, and the folly which led him to cross these barren, hot, and dusty surfaces, there is nothing he will more certainly do, whether on foot or mounted, than tumble into one of these same badger holes, and yet the chances are more than equal that he never sees a living badger on which to revenge himself; for the badger is a shy and timid animal, and the country which he inhabits is so open, it rarely happens that he is surprised at a distance from his burrow. During our march of several hundred miles through the country inhabited by the badger this did occur, however, on one or two occasions, and gave rise to some ludicrous scenes. The badger, though far from formidable, is too well provided with teeth to be handled without gloves; and knowing that his only safety when attacked is in plunging to the bottom of his burrow, his pig-headed pertinacity in endeavoring to reach it is such, that an unarmed man finds it difficult to stop him.

Mr. Anderson, who gave me most efficient aid in collecting, came one day suddenly upon a badger at some distance from his hole; of course he made for it with all possible speed, which, it should be said, is not so great but that a man could easily overtake one. Mr. Anderson first endeavored to trample him under his horse's feet, but, though he ran over him several times, the badger avoided the hoofs, and received no injury. As we had not then obtained a specimen, he was particularly anxious to secure this one, so he drove his horse before him, and brought him to bay. He then jumped off, and went towards him, hoping, by means of kicks

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and his sheath-knife, to despatch him, but the badger, instead of retreating, came at him open-mouthed, and with such a show of ferocity that he was fain to let him pass, trusting to find a club to kill him with; but in that region clubs do not "grow on every bush," for most of the bushes are sage bushes, and before he found any sort of a stick the badger had reached his hole. Two days after I became indebted to him for a fine specimen, which a long rifle shot had dropped at the entrance of his burrow. Another, while leisurely following an old trail, apparently on a journey, was overtaken and killed by some of our soldiers. Seeing, perhaps, the hopelessness of the attempt, he made no effort to escape, but a vigorous defence, and was only despatched with some difficulty.

The burrows of the badger penetrate the light volcanic soil of the western plains in all directions; and often it has occurred that while riding unsuspectingly over an unbroken surface my horse has suddenly sunk into one of these old burrows the whole length of the fore or hind legs, sometimes extricating himself only with considerable effort.

It may seem surprising that an animal of so little prowess, so little speed and cunning, should find a subsistence in a region so nearly barren of animal and vegetable life as that which I have described; but the number of Spermophiles and Arvicolae which are found there is surprising, considering the circumstances in which they live, and I suspect they furnish him the greater part of his food, his unequalled power and skill in burrowing enabling him with comparatively little trouble to follow them to the bottom of their holes and devour them at leisure. The number of badgers inhabiting any given space is small, as they seem to be a singularly solitary animal; and a large part of the burrows which they make, and which we see, and perhaps fall into, are never occupied by them as domicils, but are made in pursuit of food.

Of the considerable number of badgers and badger skins which I saw at the west, scarce any two were of precisely the same color. Some were of a pale dirty brown, while others were of a rich dark chestnut, with the hairs of the back tipped with silver. When irritated, the badger shakes up his thick coat of hair, as the owl and hen their feathers, in order to appear as large and formidable as possible. At such times, the back is flattened and the sides expanded, the long hair projecting like the shell of a turtle or the eaves of a house. The hair is so arranged also as to display the variety of color to the greatest advantage, and under such circumstances a good specimen of a badger becomes a very handsome animal.

Our specimen of badger was collected at Klamath lake.

PROCYON HERNANDEZII, Wagler.

Black-footed Raccoon.

Procyon hernandezii, Wagler, Isis, XXIV, 1831, 514.
Wiegmann, in Archiv, III, 1, 1837, 367.—Ib. Annals and Mag. N. H. I, 1838, 133.
Wagner, Suppl. Schreber, II, 1841, 157; also in Schreber Säugt. III, pl. cxliii, A, (interpolated.)
Baird, Gen. Rep. Mammals, 1857, 212.
? *Procyon nivea*, Gray, Charlesw. Mag. N. H. I, 1837, 580. (Albino.)

Sp. Ch.—Larger than *P. lotor*. General color greyish white, with a tinge of yellowish; long hairs tipped with black. Under fur dark brown. A large oblique black patch on the side of the face continuous with a paler one under the chin. Sides and under part of the muzzle, posterior margin of the cheek patch, and the ear, whitish. Tail tapering to tip, with five or six annuli and the tip black; the annuli half as wide only as the rusty whitish interspaces. Hind feet exceeding four inches; the upper surface mostly dark brown. Naked part of the soles three inches.

Varies in lighter colors and substitution of rusty brown or chestnut for the black tints.

This raccoon, regarded as distinct from the eastern species, inhabits all parts of California, Oregon, and Washington Territories; specimens having been obtained from widely separated

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localities, and its characteristic track observed in almost every place to which game resorted to drink. It is, however, less abundant on the Pacific slope than is the eastern species in most parts of the valley of the Mississippi; being confined to the wooded districts, and found most abundantly in the foot hills of the Sierra Nevada, in California. Considerable numbers are sold in the San Francisco market, to be eaten, commanding a price of from one to three dollars each. I could not learn that the skin was ever made an article of traffic in California. I saw a number of raccoons in confinement in San Francisco, all of which exhibited precisely the movements, the habits, the attitudes, and the temper of the eastern raccoon, and I noticed no striking peculiarity of form or color.

Specimens were obtained in the San Francisco market.

URSUS HORRIBILIS, Ord.

Grizzly Bear.

Ursus horribilis, ORD, Guthrie's Geography, 2d Am. Ed. II, 1815, 291, 299.
BAIRD, Gen. Rep. Mammals, 1857, 219.
Ursus ferox, ("LEWIS & CLARK,") RICHARDSON, F. B. A. I, 1829, 24; pl. i.
AUD. & BACH, N. A. Quad. III, 1853, 141; pl. cxxxi

SP. CH.—Size very large. Tail shorter than ears. Hair coarse, darkest near the base, with light tips. An erect mane between the shoulders. Feet very large; fore claws twice as long as the hinder ones. A dark dorsal stripe from occiput to tail, and another lateral one on each side along the flanks, obscured and nearly concealed by the light tips; intervals between the stripes lighter. All the hairs on the body brownish-yellow or hoary at tips. Region around ears dusky; legs nearly black. Muzzle pale, without a darker dorsal stripe.

To the westward of the Rocky mountain range, the grizzly bear seems to have appropriated to himself the southern of our Pacific provinces, leaving the more northern territories to his less powerful congeners, the black and brown bears. The reasons for this peculiar distribution of species are not very obvious, but it is evidently an exhibition of that system in nature which provides by giving a wide range of habit to the different animals for the development of a large amount of animal life in every important division of the almost infinitely varied surface of the earth. That the habitat of the grizzly is not determined by temperature we know, for his thick and shaggy coat affords a better defence against cold than the finer and thinner fur of the black bear, and in the Rocky mountains the range of the grizzly extends at least as far north as the line of the British possessions.

Differences in the food of the two species, where the food is so nearly identical, seem hardly adequate to account for their distribution. It appears to me rather to turn on the more sylvan habit of the black bear, his greater aptness at climbing, and his evident preference for a country covered by a heavy growth of timber. He is the bear of the forest, while the grizzly is the bear of the "chapparal;" the latter choosing an open country, whether plain or mountain, whose surface is covered with dense thickets of "manzanita," or scrub oak—which furnish him with his favorite food—and clumps of service bushes and low cherry, and whose streams are bordered by tangled thickets of grape vines and wild plum.

Whatever the cause, the fact is unquestionable, that west of the Rocky mountains the grizzly bear becomes very rare after passing the parallel of 42°. They are rather unpleasantly abundant in many parts of the Coast Range, and Sierra Nevada, in California, where large numbers are annually killed by the hunters, and where not a few of the hunters are annually killed by the bears. About Shingletown and McCumber's flat, northeast of Fort Reading, and around the

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base of Lassen's butte, they are very numerous. This region is partially covered with a forest of rather scattered trees of immense size, of sugar and yellow pine, western balsam fir and *libocedras*, with wide intervals covered with a dense growth of *manzanita*, *ceanothus*, and low scrub oak. These thickets are the favorite haunts of the bear, and are intersected in every direction by their well-beaten paths.

After crossing the divide and descending into the interior basin, from which Pit river issues through its lower cañon, grizzly bear "signs" became more rare, but were noticed on every day's march till we reached Klamath lake. Here the country becomes more productive, the mountain slopes being covered with bushes of service berry, gooseberry of several kinds, plum and cherry trees, all loaded with fruit, upon which the numerous tracks proved many bears were feeding.

At San Francisco a large number of "grizzlies" are kept in confinement in different parts of the city, and while there I frequently amused myself by watching them and studying their habits. Two of these were quite large, and said to weigh, respectively, eight hundred and one thousand pounds; and they, with a cougar, an elk, a *navajo*, (four-horned sheep,) an ocelot, and a bald eagle, went to make up a kind of menagerie, where I frequently spent an hour.

These grizzlies were under perfect control, and were knocked about entirely without ceremony by the showman, yet unresentingly, and he would even go so far as to ride upon their backs. He used to give interest to each day's entertainment by getting up a wrestling match between the bears, when they would tumble one another about with considerable spirit, yet usually very goodnaturedly. The reward which more than any other stimulated them to effort was tobacco, of which they seemed very fond. If undisturbed, however, they were very lethargic, lying the whole day through, each rolled up into a huge ball of fur, nearly as high as the animal when standing.

A very beautiful bear, eighteen months old, and weighing nearly five hundred pounds, was confined by a long chain near a slaughter house, in the environs of San Francisco, and just beside the road I was every day compelled to travel. He had always been well fed, was very fat, and, for a bear, very good natured. Every day some one of the butchers would have a wrestling match with him, into the sport of which he would enter with great zest, yet never evincing anything like ferocity; indeed, to all mankind, he had been, so far, entirely harmless. Not so, however, toward the pigs. For pork he seemed to have a special fondness, and he exhausted all his bearish cunning to draw within the circle, of which his chain was the radius, the vagrant shoats which ranged around the slaughter house. He would leave his food half eaten or untasted, that it might attract the pigs, while he, retreating under the cart to which he was chained, watched their motions with all the silent cunning of a cat. Woe to the unlucky pig which, drawn by the bait, came within that magic circle! he ceased to grow old from that hour.

Like most bears he was also very fond of sweets, of which a poor laborer, living in the vicinity, had satisfactory, or rather unsatisfactory proof. Sometimes the bear would break his slender chain, and range about the place at his own free will, doing no harm, but sometimes frightening people, until he was caught and tied up again. One day, when the bear was at liberty, this poor laborer was passing, just at evening, with his hard-earned pay converted into a sack of sugar, which he carried on his shoulder to his family. He heard a step behind him, to which he paid no attention till he felt violent hands laid on his sack of sugar. Turning round, what was his consternation to find himself face to face with a large bear. Of course he was frightened,

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dropped his bag and ran. When afterwards he returned, having gained courage and assistance, as might have been anticipated, the sack was empty.

The track of the hind foot of the grizzly bear is very like that made by the foot of a negro; one of the thousand things which give the bear a kind of human character. His attitudes and motions, his arm-like use of the fore leg, his fun and malice, and, if we may believe the hunters, his festive games, wrestling matches and dances, are very human.

URSUS AMERICANUS.

Black Bear; Cinnamon Bear.

Ursus americanus, BAIRD, Gen. Rep. Mammals, 1857, 225, 228.

The black bear inhabits all portions of Washington and Oregon Territories, extending its range into California only near the coast. Near Fort Jones it has been occasionally killed, but south of that point it is replaced by the grizzly. In passing from California to Oregon, by way of the Klamath lakes, we found no traces of it till we reached the headwaters of the Des Chutes river; there we saw no grizzly "sign," but the black bear was evidently very abundant. Several were seen by the members of our party, but they were very shy, and none were killed. The light volcanic soil, composed of disintegrated pumice, of the region bordering the main fork of the Des Chutes, as it issues from the Cascade mountains, sustains little vegetation except the yellow and spruce pines, (*P. brachyptera* and *P. contorta*,) and receives and retains the impress of the feet of passing animals with almost the fidelity of snow. On this surface, therefore, we had an authentic record of the fauna of the region. The elk, the mule, the white-tailed deer, the antelope, the badger, the red fox, the coyote and large gray wolf, Townsend's hare, the artemisia hare, all had there made their marks—even the striped squirrels, *Spermophilus lateralis* and *Tamias townsendii*, had recorded their visits to the bushes of red gooseberry and ceanothus, which furnish them with food. Among these hieroglyphics, by far the most conspicuous, and perhaps most numerous, were those in which the black bear had told us of his various wanderings. His tracks, deeply sunk in the yielding surface, resembled those of a horse, only set more closely together; and during the interval that had elapsed since winter's rains and snows had obliterated all former records, the bear had passed and repassed so frequently that the ground in some localities was tracked up like a barn yard.

The subsistence of the bears of the region I have described is evidently, for the most part, vegetable. The manzanita, (*Arbutus laurifolia*,) the wild plum and cherry, which fruit profusely and are very low, and especially the whortleberry, which covers whole hill-sides in the Cascade mountains, furnishing an unheard of quantity of large and fine fruit; all these assist in making up their bill of fare. Rarely, too, we saw trees of the yellow pine bearing marks of bears' teeth, where they had torn off the bark to get at the succulent inner layer, which is capable of sustaining life, and to which the Indians very generally have recourse when pressed by hunger. I have known the black bear of the eastern States strip off the bark of the hemlock spruce (*A. canadensis*) for the same purpose.

The brown or cinnamon bear, generally regarded by naturalists as a variety of the black species, inhabits the same territory and shares the habits and the food of the black bear.

I made every effort to secure good specimens of the brown bear in order to settle the question of its relations, for the hunters and Indians whom I consulted generally regarded them as distinct, but I could only obtain the prepared skins. Lieutenant Crook, United States army, a thorough sportsman and a careful and accurate observer, tells me that he killed a brown bear in Scott's valley, California, *in a tree, engaged in tearing off a branch from which a hornet's nest was sus-*

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pended, evidently designing to possess himself of the nest that he might eat the young insects which it contained. This is precisely the habit of the black bear, to which the cinnamon bear, if distinct, must be very closely allied The color, though a striking peculiarity, is subject to considerable variation; and the *texture* of the coat is very similar in black and brown bears, and very different from the thicker, coarser, and rougher covering of the grizzly. I saw a black bear skin, brought by Lieutenant Day, United States army, from the head of Salmon river, Oregon Territory, which was as soft and lustrous as silk.

The size of the black bear of the west is about the same as in the eastern States; the brown bear is represented as being rather larger and longer limbed. Both are hunted with much less fear and caution than the formidable grizzlies.

OTARIA ———?

The Sea Lion.

This large seal is quite abundant on the few rocky islands which lie off the coast of Oregon and California. In passing from Crescent City to San Francisco we saw immense numbers of them on the detached rocks a few miles from shore, near Cape Mendocino. Some of these rocks were covered with them, basking in the warm morning sunshine. As the steamer approached, they began to be disturbed, moving about with considerable facility, and making a hoarse kind of growling or barking in chorus; in their movements, their color, and their cries, resembling a crowd of black and brown bears. As we came nearer, most of them scrambled to the edge of the rocks and threw themselves, sometimes from the height of eight or ten feet, into the sea, one or two, perhaps old or disabled individuals, usually remaining and keeping up a defiant growl while we were passing. In the water they still kept together, showing only their relatively small heads, swimming and diving with great ease and rapidity. There was considerable diversity of size and color among them. Some were evidently quite young, and others larger than the largest grizzly bear. he variation of color was from dark brown, almost black, to light fulvous.

At the Farallones islands, forty miles off the coast, and opposite San Francisco, this, with several other species, is very abundant. They there attain a weight of two thousand pounds and over, and are exceedingly ferocious. During the nuptial season the fierce and bloody battles between the males make of these islands a perfect pandemonium, and all the old males, bloody and scarred, carry on their sides and shoulders evidences of their recent or remote conflicts.

They are sometimes killed with fire arms, though, from their great size and tenacity of life, it is rare that a mortal wound is inflicted. While we were in San Francisco, in June, 1855, Dr. Wm. O. Ayres, of that city, visited the Farallones, bringing back a variety of interesting matter, both of specimens and facts, illustrative of the fauna of those islands. Amon other things, the skull of a sea lion, in reference to which, as he presented it to the California academy, he made the following remarks:

"This specimen is of interest as illustrating, in one particular, the habits of these animals. The left zygomatic arch has been perforated by a bullet, and the lower part of the left inferior maxillary bone shattered by another; both of these injuries having been received so long since that the action of the absorbents has almost smoothed the splintered edges of the bones. Inside of the wound of the zygoma was found the piece of lead which had caused it, and which was at once recognized, from certain peculiarities of form, as one which had been fired, without fatal effect, at a sea lion, on the same rocks, in the summer of 1854. We have thus a demonstration

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that these huge seals return, in some instances at least, year after year to the same localities. They leave the Farallones in November, and return in May, being absent about six months. How far they migrate during that interval we have, at present, no means of determining. The one from which the skull was taken was estimated to weigh about a ton.''

PHOCA ——?

Seal.

This seal penetrates San Francisco, San Pablo, and Suisan bays, and even follows up the Sacramento river for some distance.

While duck shooting on San Pablo bay, we were many times amused, and sometimes a little startled, to see a round head, as large as that of a man, suddenly and silently raised above the water near us, and a pair of goggle eyes, just enough human to make them horrible, staring at us, recalling all sorts of stories of strangled innocence rising to confront the murderer. Usually, after taking a good look at us, the head would sink as silently as it rose, leaving us in a pleasant state of uncertainty whether it was ghost or demon that had formed the apparition. After a longer or shorter interval that bullet head and goggle eyes would appear on the other side of the boat, rising and sinking in the same ghostly way, and giving no hint, but leaving to the imagination what might be appended to this curious head piece.

A similar apparition startled me one quiet Sabbath morning when sitting on the trap rocks at the Dalles of the Columbia; the more, as I should as soon have expected to see a whale as a seal at that distance from the Pacific and above the Cascades.

DIDELPHYS CALIFORNICA, Bennett.

California Possum.

BAIRD, Gen. Rep. Zool. 1857, 233.

Guided only by my own observations, and by what I could gather from verbal testimony, I should have said that the opossum does not exist in California or Oregon. We have, however, the positive evidence of other witnesses that it does exist there; and, therefore, my negative evidence goes for nothing unless as an indication of its rarity.

On the light volcanic soil of southeastern Oregon, over which we travelled for days together, a surface which takes a track almost as well as snow, though I looked carefully for the tracks of the opossum, so peculiar that they could hardly be mistaken or overlooked, I never saw it in all that region; nor did any of our party.

I am therefore convinced that if the opossum exists west of the Rocky mountains, it is much more rare than in the eastern States.

SCIURUS FOSSOR, Peale.

California Gray Squirrel.

Sciurus fossor, PEALE, Mamm. and Birds U. S. Ex. Ex. 1848, 55.
AUD. &. BACH. N. Am. Quad. III, 1854, 264; pl. cliii, f. 2.
BAIRD, Gen. Rep. Mammals, 1857, 264.
Sciurus heermanni, LECONTE, Pr. A. N. Sc. Phila. VI, Sept. 1852, 149.

SP. CH.—Size of *S. vulpinus*, but more slender. Tail vertebræ as long as the body; with the hairs, much longer. Five upper molars. Above, grizzled bluish gray and black; beneath, white, without any differently colored separating line. Tail black, with the exterior white; the whole under surface finely grizzled. Back of the ears and adjacent tuft on the occiput, chestnut.

This large and handsome squirrel inhabits the pine forests of all parts of California in which pine forests exist. We did not observe it in any part of Oregon, and if it is found there it

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must be rare. It is nowhere very abundant, but is rather common in the coniferous forests of northern California, where it is hunted by the scattered residents with great zest, both for the sport which it affords, and because of its excellence for the table.

It is eminently a tree squirrel, scarcely descending to the ground but for food and water, and it subsists almost exclusively on the seeds of the largest and loftiest pine known, *P. Lambertiana*, the "sugar pine" of the western coast. The cones of this magnificent tree are from twelve to sixteen inches in length, and contain each one hundred or more seeds of the size and shape of the small white bean of commerce. These cones would be unmanageable by the squirrel in the tree, and he has the habit so common in the family of dropping them to the ground, where he can dissect them at leisure. This he usually does in the early morning, climbing to the extremities of the topmost branches where the cones hang, and cutting off a sufficient number to supply his wants for the day. He then descends, and commencing at the base of the cone, tears off the scales in succession, and skilfully possesses himself of the seeds which they conceal. He is, however, compelled to supply other wants than his own, for the smaller pine squirrel, *S. douglasii*, and the ground squirrel, *Tamias townsendii*, appropriate a large share of his booty. When oak trees are near and acorns are ripe, he has recourse to them for subsistence, as often as opportunity offers, robbing the woodpeckers of their stores, in which, also, he has the active co-operation of his more diminutive congeners.

From the fact that he feeds upon the ground it has been supposed that he was less active and less fitted for climbing than most tree squirrels. This, I think, is not true. He is exceedingly quick and graceful in his movements, and if less frequently seen to spring from tree to tree than the black and grey squirrels of the eastern States, it is because he inhabits coniferous trees, which are remarkable for the insignificance of the branches compared with the size of the trunk, the limbs never stretching out and interlocking, as those of the oak and maple and other trees in which our more common species live.

Possessing all the vivacity of the genus, his size, the neatness and beauty of his colors, and especially the graceful curl of his long and distichous tail, render him, perhaps, the finest squirrel found in our country.

Specimens were obtained from Stockton and Fort Jones.

SCIURUS DOUGLASII, Bach.

Oregon Red Squirrel.

Sciurus douglasii, ("GRAY,") BACHMAN, Pr. Zool. Soc. Lond. VI, 1838, 99.—IB. Jour. Acad. Nat. Sc. Phila. VIII. ("BACH.") AUD & BACH. N. Am. Quad I, 1849, 370; pl. xlviii.
BAIRD, Gen. Rep. Mammals, 1857, 275.
Sciurus suckleyi, BAIRD, Proc. Acad. Nat. Sc. Phila, VII, April, 1855, 333.

Size that of *Sciurus hudsonius*, or a little larger. Ears well tufted; tail shorter than the body, scarcely flattened. Soles naked in the centre. Above, dull rusty, and black, mixed; the latter quite predominant; beneath, clear bright buff, without mixture of dark or annulated hairs. A dark stripe on the sides. Tail dull chesnut centrally, darker above; then black and margined all round with rusty white. Hairs at tip of tail entirely black, except at their extremity.

More northern specimens in winter have the soles densely hairy to the toes, the fur much fuller and softer, the under parts with dusky annulations, the general hue grayer. Size about that of *S. hudsonius*, or a little larger. Head short, broad. Whiskers longer than the head; black. Thumb, a mere callosity; fingers well developed, the central two longest and nearly equal; the inner rather longer than the outer; claws large, compressed, and much curved; palms naked. On the hind feet the inner toe is shortest, reaching only to the base of the claw of the outer, which comes next in size; the fourth is longest, the third and second little shorter. Claws all large and much curved. In summer the soles are naked, except along the edges and the extreme heel; in other words, there is a narrow central line of naked skin from near the

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heel; they are more hairy in winter. The ears are moderate, with short close hairs on their concavity; the back of the ear is covered with long hairs, those near the upper margin longest, and projecting beyond nearly five lines in some specimens; these tufts are nearly black. The tail is small, shorter than the body, moderately flattened; the hairs rather short, and, as on the rest of the body, coarse and stiff.

Among the magnificent trees of the Cascade mountains, near the head of the Des Chutes river, some new to science and all novel to us, and feeding on their seeds, were numbers of, as I at first supposed, the same little pine squirrel we had so often seen in California, somewhat changed, however, I thought, both in color and habits; its color paler and less brilliant, and having, in a great degree, lost the black line of the side; in manners, far more familiar. The first I attributed to climate; the second, to his ignorance of the usages of civilized society; he not having learned that man wages a relentless war against just such beautiful and harmless little animals as himself. These differences, if not specific, certainly indicated a different variety.

I was sometimes greatly amused at the antics of one of these little fellows. As I approached the tree on which he sat, instead of retreating, he would sit still and scold, or even come out on a branch within a few feet of my head, as though curious to examine, and determined to drive away this strange animal which had invaded his solitude. Perched on the end of the branch, constantly scolding and twisting from side to side, he would balance himself on his feet as though about to spring upon me; then, his fears getting the better of his valor, he would scamper away and hide himself behind the trunk. Reassured by a few moments of quiet on my part, he would bristle up and again rush out to the end of the limb, apparently finally resolved to throw himself down upon me. This he would never do, however; and at length, having failed to produce any impression upon me by his graces and grimaces, his bluster and bravado, he would scramble up the tree and into some hole, apparently in intense disgust, scolding as long as I was near.

SCIURUS DOUGLASII, Var.

California Pine Squirrel.

This little squirrel, the Californian representative of the red squirrel of the eastern States, (*S. Hudsonicus,*) is quite equal to that species in activity. It is found in the evergreen forests throughout California and southern Oregon, perhaps extending its range to the Columbia, though we found it replaced in the Cascade mountains by another variety much resembling it, but less highly colored.

This little fellow is everywhere known as the pine squirrel, though the name is not strictly correct, as it lives on almost all kinds of evergreen which furnish edible seeds. Evergreen squirrel would be better, but that some hypercritical person might object to calling that *evergreen* which was *never* green. The name pine squirrel might, however, be disapproved of on the same grounds, as I can testify that he is far from being a wooden animal. Let us, however, call him pine squirrel, at least for the present, and follow him to his haunts.

In the forests of redwood, (*Sequoia sempervirens,*) on the Coast Range, north of San Francisco, he finds a most agreeable residence; and among the great sugar pines (*P. Lambertiana*) of the Sierra Nevada and the Trinity mountains he is well known, and is a favorite symbol of rapidity with the epithet-loving hunters of the frontier, having, in their phraseology, taken the place of chain lightning, than which he is regarded as a shade swifter. He is usually shy, and frequently difficult to shoot. I have sometimes, while moving stealthily through the forest,

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surprised one of these little fellows seated and engaged in his favorite occupation, tearing to pieces a pine cone, and surrounded by bushels of chips, indicative of his industry. At such times he utters a short, sharp, solitary bark, something like the chirp of the striped ground squirrel, but louder and harsher. His attitude is the embodiment of grace, and his erect ears, his full, black, brilliant eye, the neatness of his colors—greenish grey above, red below, with a sharply defined black line separating the two—altogether render him one of the prettiest of the genus; so pretty is he, indeed, that my gun has often refused to do its duty before such a sprightly innocent so entirely in my power.

I have several times watched these little fellows while gathering their food. Like the larger pine squirrel, their habit is to go into the tree and cut off and throw down a number of the cones, and then descending to tear them up at leisure. Unlike *S. fossor*, however, this squirrel has a burrow either under or in fallen logs, where the pine seeds are carried and stored for winter. By this habit, it is allied to the ground squirrel, (*Tamias* 4-*vittatus*,) which is its constant associate in the region which it inhabits.

TAMIAS.

Striped Ground Squirrel.

TAMIAS TOWNSENDII.

Townsend's Striped Squirrel.

Tamias Townsendii, BACHMAN, Jour. Phila. Acad. Nat. Sc. Phila. VIII, I, 1839, 68.
BAIRD, Gen. Rep. Mammals, 1857, 301.
AUD. & BACH. N. Am. Quad. I, 1849, 159; pl. xx.
Tamias hindsii, GRAY, Annals & Mag. N. H. X, 1842, 264.
Tamias cooperii, BAIRD, Pr. Ac. Nat. Sc. Phila. VII, April, 1855, 334.

SP. CH.—Larger than *T. striatus*. Tail, with hairs, nearly or quite as long as the body. Sides of head striped. Above and on the sides rufous brown, with five dark stripes reaching to the tail, the intervals between which are scarcely or but seldom paler than the ground color; beneath, dull white. Ears dusky brown, hoary posteriorly. Tail bright chestnut beneath, margined with ashy white, within which is a band of black. Length, five to six inches. Hind foot, 1.40 to 1.50. Varies in rather paler colors, ash colored interspaces, and sometimes the back with black hairs interspersed, so as to obscure, or nearly conceal, the dorsal stripes.

TAMIAS QUADRIVITTATUS.

Missouri Striped Squirrel.

Sciurus quadrivittatus, SAY, in Long's Exped. R. Mts. II, 1823, 45.
Tamias quadrivittatus, AUD. & BACH. N. Am. Quad. I, 1849, 195; pl. xxiv.
BAIRD, Gen. Rep. Mammals, 1857, 297.
Tamias minimus, BACHMAN, Jour. Acad. Nat. Sc. Phila. VIII, I, 1839, 71.

SP. CH.—Tail, with the hairs, nearly or quite as long as the body. A greyish white stripe along the top of the head, with branches passing above and below the eye. The stripe bordered above and below by darker ones, and separated behind the eye by a dark line. A grey or hoary patch behind the ears. Sides of body deep ferruginous; back with five about equidistant dark stripes, nearly black on the posterior part of the body, their intervals forming four greyish white lines of similar dimensions to them. Tail, when flattened out, ferruginous externally, then black, then ferruginous. Body beneath, dirty greyish white. Length, four to five inches. Hind foot, 1.20 inch.

These little striped squirrels we found in the pine woods from Fort Reading to the Columbia, and I doubt if any day passed during our journey in which they were not seen by some of our party. Their cry is somewhat like that of our eastern species, *T. striatus*, but not so loud, nor so frequently repeated. In California, their subsistence is derived from the oaks and pines, and from the seeds of the everywhere abundant "manzanita." In northern California and Oregon,

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in summer and fall, they feed on the seeds of the pines and firs to some extent; but their great storehouse of provisions is formed by the thickets of large species of *Ceanothus*, (*C. laevigatus* and *C. velutinus*,) the seeds of which are the favorite food of all the ground squirrels inhabiting the region where they grow.

In the Cascade mountains are immense stretches of country where the pine and fir forests have been destroyed by fire—the trees not burned, but killed, and all thrown down by the wind, covering the ground with an almost impenetrable labyrinth of interlocking trunks. Over this surface spring dense and continuous thickets of *Ceanothus*, and great numbers of clumps of gooseberry bushes, which are loaded and reddened by an unparalleled profusion of large scarlet berries, very beautiful to the eye, but perfectly flat and insipid to the taste. These thickets are the favorite haunts of the little ground squirrels, and they, with the ruffled grouse, find good use for all these scarlet berries. My attention was first called to the fact of their feeding on these berries by the blood red imprints of the squirrels' feet on the smooth and barkless trunks of the fallen pines; and as these tracks multiplied, I began to wonder at the ferocity of the squirrels of this region, which covered the country with blood. As the gooseberry bushes became more numerous, I detected the connexion between their fruit and the crimson tracks, and at the same time found a good reason for the production in such extreme abundance of fruit so entirely useless to man, and apparently so little relished by the man-like bears.

SPERMOPHILUS DOUGLASII.

Columbia Ground Squirrel.

Arctomys (*Spermophilus*) *douglasii*, RICH. F. B. A. I, 1829, 172.
Spermophilus douglasii, AUD. and BACH. N. Am. Quad. I, 1849, 373; pl. xlix.
BAIRD, Gen. Rep. Mammals, 1857, 309.

SP. CH.—Similar in most all respects to *S. beecheyi*, but with the space on the nape and back, between the light colored more lateral patches, of a uniform dark brown, nearly black.

The "ground squirrels," as the different species of *Spermophilus* are commonly called, are, to a stranger in California, a new and interesting feature of the zoology of the country. He has probably heard of the villages of "prairie dogs" on the plains of central North America, and has listened with interest or incredulity to the stories of these strange communities made up of such incongruous materials as mammals, birds and reptiles, spermophiles, owls, and rattlesnakes. If he should happen at any time to traverse the valley of the Sacramento, in California, he will be no lover of nature if he be not gratified, and even delighted, to see with his own eyes, and to examine closely, the villages of owls and spermophiles which he will be sure to pass.

These squirrel colonies, composed of individuals of the species *S. douglassii* and *S. beecheyi*, are not organized on the same plan or in similar places with those of the prairie dog (*Cynomys ludovicianus*.) The prairie dog inhabits open prairies, its villages being composed of closely set burrows, frequently spread over a surface of miles in extent. This species is not found in California, where the spermophiles are all long-tailed, and more or less arboreal in their habits. Nor are they, by any means, as social as the prairie dogs; a single individual being frequently found living at a distance from all others, usually under some tree, into which he often climbs, and from which you will probably dislodge him by your approach, as his burrow is his citadel, to which he betakes himself on the least alarm.

We first saw the spermophiles in considerable numbers in the belts of timber which border Suisun, Cache, and Putos creeks. These streams come down from the Coast Range and

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cross, with sinuous courses, the plain which forms the western half of the Sacramento valley, till they meet the Sacramento and into it discharge themselves. The Sacramento valley here, as generally, is nearly level and destitute of trees, except such as border the streams. These belts of timber vary in width, from a single line of trees along the water's edge, to strips of forest one and even two miles wide on either side. Except the willows and sycamores on the river bottoms, these timber belts are composed of magnificent oaks of a species peculiar to California, (*Quercus longiglandis*,) which has a wide spreading growth like the English oak, as it grows at Hampton Court and Windsor.

The trunk, rarely less than two, frequently seven or eight feet in diameter, rises eight, ten or twelve feet from the ground, and then divides into huge arms, which throw themselves out at right angles, and, bending low to the ground, cover a surface of one hundred or more feet in diameter. These trees are not thickly set, but usually scattered over the turf-covered ground in graceful groups of giants, whose branches touch each other with intervening open glades, sunny and smooth, of one, two, or three acres. Under these oaks not a bush can be seen; and below the limbs, where the trees are thickest, there is nothing to impede the view over the grass-covered surface but the colossal trunks which gather in the perspective and limit vision. Here the spermophiles live in thousands; under each tree a sub-colony which have, parent and child, pierced the earth with their burrows until they have thrown up, of the excavated material, a mound, not often more than from twelve to eighteen inches in height, yet very perceptible to the eye.

These squirrels are long-tailed and long-eared for spermophiles, and have much the form and action of the true squirrels. They are very timid, starting at every noise, and on every intrusion into their privacy dropping from the trees, or hurrying in from their wanderings, and scudding to their holes with all possible celerity; arrived at the entrance, however, they stop to reconnoitre, standing erect as squirrels rarely, and spermophiles habitually do, and looking about to satisfy themselves of the nature and designs of the intruder. Should this second view justify their flight, or a motion or step forward still further alarm them, with a peculiar movement, like that of a diving duck, they plunge into their burrows, not to venture out till all cause of fear is past. Should you in the meantime have seated yourself with your back against a tree, and have remained for a time as immovable as the trunk against which you lean, you will soon see sundry little heads protruded from the burrows, with as many pairs of eyes and ears skilled to detect the least sign of danger from their equally feared enemies, the coyote, the California vulture, the red-shouldered and red-tailed hawk, and man himself. If, however, your silence and quietness persuade them that you are none of these, they will swarm forth from their holes, and at first timidly, but, gaining confidence, more fearlessly, engage in all the sports and antics for which the *Sciuridae* are noted, and in which none excel the species under consideration. It is a pretty sight, and one to which I have often treated myself, to sit down quietly under these old oaks and watch the squirrels running about over the grass and trees, gamboling and playing together. As far as the eye could reach through the vista the sprightly movements of these innocent animals could be discerned.

Their most important element of subsistence is the acorn, which the trees produce plentifully, and which the squirrels store up in their holes. In the absence of acorns, they have recourse to such roots and seeds as they can glean in the vicinity of their habitations. In the neighborhood of cultivated grounds they inflict material injury on the growing crops; one farmer, on Cache creek, telling me that the squirrels had eaten up full half his wheat. The number then swarming over his fields and fences was incalculable.

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S. douglasii is a brighter and handsomer species than *S. beecheyi*, with which it is commonly confounded. It has, too, a dark, almost heart-shaped spot on the shoulders, which is wanting in *S. beecheyi*. It is apparently more boreal in its range, as the most common species about San Francisco and Santa Clara is *S. beecheyi*, while in the Upper Sacramento valley, and the Klamath lake basin we found only *S. douglasii*. I saw in the pedregal region of Pit river a smaller species, different from both, and possibly new, but I could not secure specimens.

The owl which lives with the spermophiles is *Athene hypugaea*, the same found with the prairie dogs. Rattlesnakes we did not see with them, but they are common enough everywhere, and may live with the owls and squirrels. The idea so prevalent that the owls and squirrels occupy the same burrow at the same time is probably erroneous, the owl generally taking possession of the deserted burrows of the squirrels. The rattlesnakes are probably not very observant of the rights of property, but make themselves at home wherever they find comfortable lodgings and meals furnished at the cost of the least labor to themselves.

Specimens were collected at Klamath lake, O. T.

SPERMOPHILUS BEECHEYI.

California Ground Squirrel.

Arctomys (Spermophilus) beecheyi, RICHARDSON, Fauna Boreali-Americana I, 1829, 170; plate xii, B.
Spermophilus beecheyi, BAIRD, Gen. Rep. Mammals, 1857, 307.

SP. CH.—Size of the cat squirrel, *S. cinereus*. Ears large, prominent. Tail more than two-thirds as long as the body. Above, mixed with black, yellowish brown, and brown in indistinct mottlings; beneath, pale yellowish brown. Sides of head and neck, hoary yellowish, more or less lined with black; a more distinct stripe of the same, from behind the ears on each side, extending above the shoulders to the middle of the body. Ears black on their inner face. Dorsal space between the stripes scarcely darker than the rest of the back. Length, 9 to 11 inches; tail, with hairs, 7 to 9. Hind feet, 2 to 2. 30 inches.

In speaking of *S. douglasii*, I have given the generalities of the habits of both species, for they are nearly the same. The two species are not distinguished by the people of the country, and are frequently found in the same place. The dark spot on the back of *S. douglasii*, with its more northern habit, will serve to distinguish it. The colors of *S. beecheyi* are all less bright and handsome than those of the allied species, of which the dappling is clean white on a dark ground, while in *S. beecheyi* the colors are much as in *Cynomys ludovicianus*, all dull and dirty.

The flesh of both species is fat, tender, and well flavored, and usually regarded as preferable to that of the tree squirrels. It is, however, much more rarely brought to the market of San Francisco than *Sciurus fossor*, I was told, because so many of them had been poisoned by the farmers. To rid themselves of so great pests, they have used strychnine freely, thereby exciting a natural distrust of any which might be offered for sale.

SPERMOPHILUS LATERALIS.

Say's Squirrel.

Sciurus lateralis, SAY, Long's Exped. R. Mts. II, 1823, 46. (Arkansas river, lat. 38°.25; long. 105°.20; July 16.)
Spermophilus lateralis, AUD. & BACH. N. Am. Quad. III, 1853, 62; pl. cxiv.
BAIRD, Gen. Rep. Mammals, 1857, 312.

SP. CH.—Ears conspicuous, high. Tail, with hairs, more than half as long as head and body; depressed. Middle region of the back finely grizzled yellowish grey and black, without any lines; on each side two distinct black stripes, enclosing a yellowish white one, all of about the same diameter. Posterior half of the thigh and rump dark chestnut brown, without stripes. Top of the head chestnut. Under surface of tail bright chestnut; margined with brownish yellow, within which is a black band. Length about 7 inches; tail with hairs, about 4; hind foot, from heel, 1.42 inches.

This Tamias-like species was first described by Say, and not obtained by any of the recent government expeditions till we found it in the Des Chutes basin.

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The markings, the motions, and the habits of *S. lateralis* are very much like those of the striped squirrel, (*T. quadrivittatus*,) with which it is found. It is, however, more closely confined to the ledges of rock than is any species of *Tamias;* indeed, I never saw it except when on or immediately about piles of trap rock; and its preference for such localities, its unfailing habit of betaking itself to them for refuge when alarmed, and its facility in climbing over large loose rocks, make it decidedly a rock squirrel.

The specimens which I killed were feeding with the Tamias on the seeds of a large Ceanothus, (*C. laevigatus*,) and were very fat and well flavored, as I can testify from actual experiment, for we were at that time at a distance from the main party, and entirely out of provisions, except flour and rice, and were glad to get squirrels and trout, though both small, to add to our bill of fare. They were obtained on the upper Des Chutes, in Oregon.

APLODONTIA LEPORINA, Rich.

Sewellel.

BAIRD, Gen. Rep. Mammals, 1857, 353.

This singular animal, called by Richardson the *Sewellel*, seems limited to a narrow district when compared with most of those which, with it, inhabit the region it occupies. In Washington Territory it is found from the coast to the Rocky mountains. It is doubtful whether it will be found south of the Columbia, either on the coast range, in the Willamette valley, or on the Cascades. Eastward, however, toward the base of the Rocky mountains, it may occur. I have seen two specimens, one taken near Shoalwater bay, Washington Territory, by Dr. J. G. Cooper, and the other obtained near the base of the Rocky mountains, which were absolutely black, presenting a striking difference in color from those obtained by Lewis & Clark, Douglas, and others, which were brown, and of nearly the shade of the muskrat.

CASTOR CANADENSIS, Kuhl.

The Beaver.

BAIRD, Gen. Rep. Mammals, 1857, 355.

The beaver once inhabited all portions of the globe lying in the northern temperate zone; yet from England, continental Europe, China, and all the eastern portion of the United States, it has been entirely exterminated, and a war so universal and relentless has been waged upon this defenceless animal, his great intelligence has been so generally opposed by the intelligence of man, that it has seemed certain, unless some kind Providence should interpose, that the *Castor*, like his gigantic congener, the *Castoroides*, would soon be found only in a fossil state. Happily, that Providence did interpose, through a certain ingenious somebody who first suggested the use of silk in place of fur, for the covering of hats. The beaver were not yet exterminated from western America; and now since they are not "worth the killing" in those inhospitable regions where there is no encouragement for American enterprise or cupidity, we may hope that they will always there retain existence in a home exclusively their own.

In the streams flowing from the Rocky, the Blue, and the Cascade mountains—the old "stamping ground" of Bill Williams and that host of Blackfoot-hating, death-defying, "mountain men," whose adventures and escapes, half fiction and half fact, cover so broad a page of modern story—the sagacious beavers are still numerous; but it was in the fastnesses of the Cascades, one hundred and fifty miles south of the Columbia, in the clear, cold streams which, trickling down from the eternal snows, flow, now bright and sparkling, now deep and still,

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through mountain meadows green as emerald, and daisy-decked, in a region never before profaned by the foot of a white man, and unoccupied by savages, that we found the beaver in numbers, of which, when applied to beavers, I had no conception. The sides of these streams were literally lined with their habitations, though we never saw their houses, and seldom a dam made by them, but usually their burrows pierced the sides of the stream, a sufficiently large and long excavation being made to form warm, roomy, and comfortable quarters. From the point where these burrows terminate in the water, trails lead off to thickets of willow or pine, where the beavers find their food. These thickets exhibit the most surprising proofs of the power and industry of these animals: whole groves of young pine trees cut down within a few inches of the ground, and carried off bodily. So well was the work done that one could hardly resist the conviction that the woodman's axe had not there been plied vigorously and well. These trees, when felled, are cut into convenient lengths and carried to the burrows, there to be stripped of their bark, and then thrown into the stream. We often saw trees of considerable size cut down by the beavers; the largest which I noticed was a spruce pine twelve inches in diameter.

In California the beaver is also quite common, though less so than in Oregon. It is found in the streams flowing into the Sacramento, both from the coast range and from the Sierra Nevada. On Cottonwood creek, which comes down from the coast range, near Fort Reading, they abound, and have cut the cottonwood trees, which line the banks of the stream, of a diameter of from fifteen to eighteen inches.

To any one who has never seen the beaver in his native haunts the accounts of his mechanical skill and general intelligence, as exhibited in his dams and "clearings," must seem almost fabulous; and when he has seen these with his own eyes he cannot fail to feel that the profound respect entertained by the Indians and trappers for this sagacious animal is in a great degree deserved.

The value of beaver skins has so much depreciated that they were offered to some of our party, by the bale, at twenty-five cents each.

THOMOMYS BOREALIS.

Geomys borealis, RICH., Report British Asso. for 1836, V. 1837, 156.—(Said here to come from Saskatchewan.)
Pseudostoma borealis, AUD. & BACH., N. Am. Quad. III, 1853, 198; pl. cxlii.
Geomys townsendii, (RICH. Mss.) BACH., J. A. N. Sc. Phila. VIII, I, 1839, 105.
Thomomys borealis, BAIRD, Gen. Rep. Mammals, 1857, 396.

A single specimen of this very doubtful species was collected at Canoe creek, California. It will, in all probability, prove to be only a variety of *T. douglasii*.

JACULUS HUDSONIUS.

Jumping Mouse.

Dipus hudsonius, ZIMMERMANN, Geographische Geschichte, II, 1780, 358, (based on Pennant's long-legged mouse of Hudson's Bay.)
Meriones hudsonius, AUD. & BACH., N. Am. Quad. II, 1851, 251; pl. lxxxv.
Jaculus hudsonius, BAIRD, Gen. Rep. Mammals, 1857, 430.

SP. CH.—Above, light yellowish brown; lined finely with black; entire sides yellowish rusty, sharply defined against the colors of the back and belly. Beneath, pure white; feet and under surface of tail whitish. Body measuring 2.75 to 3.50 inches; tail, 4.50 to 6.00 inches; hind feet, 1.10 to 1.30 inches.

A specimen of this species, collected at Canoe creek, California, agrees with all other western ones in a decided superiority in size to eastern ones.

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MUS DECUMANUS, Pallas.

Brown Rat; Norway Rat.

BAIRD, Gen Report Mammals, 1857, 438.

Introduced by the ships touching at San Diego, Monterey, San Francisco, and the ports on the Columbia river, the Norway rat has probably been for many years a resident of California and Oregon. It is now, at least, unpleasantly abundant at all these places, and seems to have been ready to sanction by its presence every step of progress made by the Anglo-American in the occupation of the interior.

At San Francisco, California, and Portland, Oregon, the brown rat swarms about the wharves and cellars in apparently as great numbers as in the Atlantic cities.

The old residents of San Francisco, that is to say, those who have been there five years, say, that formerly that port of entry was occupied by a colony of white rats, of which no specimens have, to my knowledge, been preserved. It was probably nothing more than a white variety of the brown rat which is now so common there. As most persons are aware, the house mouse (*Mus musculus*) and Norway rat are both prone to exhibit this variation of color, which is hereditary, and if the white stock can be isolated, forms a permanent variety.

I could not learn that the black rat (*Mus rattus*) has ever been a resident of the Pacific coast. The testimony in this case is, however, purely negative.

MUS. MUSCULUS, Linn.

TheHouse Mouse.

BAIRD, Gen. Rep.

The little house mouse, like most other luxuries of civilization, is now enjoyed in all the habitations of whites on the Pacific coast. In the mansions of the Digger Indians probably few could be found, for the double reason that this fastidious animal would hardly find such quarters agreeable, and that the omnivorous habits of the Indians would imperil their existence. The mouse seems to have arrived with the first ships touching at the western ports, as the colonists say they have "*always*" been abundant.

HESPEROMYS GAMBELII, Baird.

California Mouse.

BAIRD, Gen. Rep. Mammals, 1857, 464.

SP. CH.—Very similar to *H. leucopus* in size and proportions. Feet perhaps shorter. Ears larger. Tail generally less than head and body, sometimes a very little longer. Above, yellowish brown, much mixed with dusky, but without a distinct broad wash of darker on the back. The entire outside of the fore leg below the shoulder white?

One specimen of this species was collected on Klamath lake, O. T.

ARVICOLA TOWNSENDII, Bachman.

Oregon Ground Mouse.

Arvicola townsendii, BACHMAN, J. A. N. Sc. Phila. VIII, 1839, 60.
AUD. & BACH., N. Am. Quad. III, 1853, 209; pl. cxliv. fig. 1.
BAIRD, Gen. Rep. Mammals, 1857, 527.

SP. CH.—Very large, (head and body 5½ inches.) Ears large; two-thirds as long as hind foot; well furred. Tail, including the hairs, rather less than half the head and body; the tail vertebræ twice the length of hind foot. Thumb claw conspicuous. Toes long; one-third the whole foot. Fur measuring a little over one-third of an inch, with a slight gloss.

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Above, dark fuscus brown, with but little yellowish brown visible. Sides paler; beneath, ashy white. Tail almost uniformly brown throughout. Feet liver brown. Skull, 1.27 + 71, or as 100 : 56.

One specimen collected at Crater pass, Cascade mountains.

ARVICOLA LONGIROSTRIS, Baird.

BAIRD, Gen. Rep. Mammals, 1857, 530.

SP. CH.—Size large, (4½ inches.) Skull, 1.08 inch. Fur long, .55 of an inch above. Ears rather small, three-fourths the length of hind foot, sparsely coated with short hairs. Feet very short; hinder ones less than three-quarters of an inch long. Tail two-fifths the body, the vertebræ twice as long as the hind foot. Above, dull yellowish chestnut, or rufous brown, mixed with black, yet without any distinct rusty. Beneath, dirty whitish ash. Line separating the colors rather distinct. Feet light brown. Tail nearly unicolor, paler beneath at the base. Skull, 1.08 + .61, or as 100 to .55. Muzzle of skull very long. Distance between upper molars and incisors more than one-third the whole length of the skull.

The single specimen collected of this new species was found on the upper Pit river of California.

ARVICOLA MONTANA, Peale.

Arvicola montana, PEALE, Mamm. & Birds of U. S. Ex. Ex. 1848, 44.
AUD. & BACH., N. Am. Quad. III, 1854, 302.
BAIRD, Gen. Rep. Mammals, 1857, 528.

SP. CH.—Size of *A. riparia*, or a little less, (4.75 inches.) Fur about half an inch long. Ears short, as long as fore foot, about half the hinder; sparsely coated with longish hairs. Feet short: hinder ones .80 of an inch. Tail long; about two-fifths of the head and body; vertebræ more than twice as long as the hind foot. Above, dull yellowish brown, uniformly and equally mixed with black; lighter on the sides. Beneath, dull whitish ash. No rusty tints. Tail distinctly bicolor. Skull, 1.12 + .62, or as 100 : 56. Distance between upper molars and incisors less than one-third the whole length of the skull.

The numbers of arvicola inhabiting the natural meadows bordering the streams of many parts of California and Oregon are surprisingly great. The little hillocks of earth thrown up form their burrows, in some localities almost touch each other. They are particularly abundant on the banks of Klamath river and the Des Chutes, and in the mountain meadows of the Cascades. Their burrows are very deep and extensive. While one morning sitting by our camp fire, on the banks of a stream in the Cascade mountains, I noticed one of these little field mice busily throwing up earth from below while enlarging his burrow. Though numerous, they are very shy and not easy to take; having failed in my efforts to secure this one as he came to the surface, I had recourse to a measure which I had, when a boy, sometimes successfully practised on the "chipmuck" of the eastern States. It was but a step to the stream, and we had two large camp kettles, holding about three gallons each; with these, assisted by Mr. Fillebrown, I attempted to drown him out, but, though we poured at least twenty gallons of water in nearly a continuous stream into the hole, we were unable to dislodge him.

Mr. Albert H. Campbell, who spent much time in California connected with the government surveys, related to me similar efforts which he has made to drown them out, uniformly without success. Another experiment of his is equally indicative of the capacity of their burrows. The *Arvicolæ* of southern California subsist, in a great degree, on the stems of a malvaceous plant which grows to the height of three to four feet. If a stalk of this plant be cut and inserted into their burrow, it will, if all is quiet, be soon drawn down, the branches cut off, and the whole disappear. Mr. Campbell informs me that he has sometimes seen six or more of those stalks, three feet long and as large as the little finger, drawn successively into the burrow of one of these animals.

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FIBER ZIBETHICUS, Cuv.

The Muskrat.

BAIRD, Gen. Rep. Mammals, 1857, 561.

I have yet to obtain evidence of the existence of the muskrat in California, or even in Oregon, though I suspect it may be found in some parts of that Territory. In the Sacramento valley, in the Klamath lake region, in the basin of the Des Chutes, places apparently fitted by nature to be paradises of muskrats, shallow rush-grown lakes and rush-bordered canal-like streams, just where, in the eastern States, muskrats would abound, though I looked carefully, I never saw the animal, his track, his habitations, nor even his characteristic heaps of emptied shells of *Unio* and *Anodonta*. I therefore concluded that in all this region the muskrat does not exist.

At Steilacoom, Washington Territory, and from there across the country to Fort Colville, and thence to the Rocky mountains and the head of Snake river, the "musquash" is found, if not plentifully, at least generally. Specimens from several localities which I have seen differ in nothing, to my eye, from the muskrat of the eastern States.

ERETHIZON EPIXANTHUS, Brandt.

Yellow-haired Porcupine.

Erethizon epixanthus, BRANDT, Mem. Acad. St. Petersburgh, 1835, 389, 416; table i, animal; table ix, fig. 1—4, skull.—IB. Mamm. exot. 55, (same as preceding.)
SCHINZ, Synopsis Mamm. II, 1845, 266.
WATERHOUSE, N. H. Mamm. II, 1848, 442.
BAIRD, Rep. Mammals, 1857, 569.

SP. CH.—General color dark brown, nearly black; the long hairs of the body tipped with greenish yellow. Nasal bones nearly one-half or two-fifths the length of upper surface of the skull.

The porcupine is an inhabitant of all our western territories. Most abundant in Oregon and Washington; it is not uncommon in the wooded portions of California. The fine specimen which I brought home was killed at Fort Reading, California, by Dr. J. F. Hammond, U. S. A.

The food of the porcupine is exclusively vegetable; in the eastern States, in winter, it feeds on the bark and small branches of hemlock, birch, poplar, &c.; in California, whenever driven by the snows to the trees for subsistence, it eats the cotton-wood, and in Oregon both that and the hemlock.

LEPUS CAMPESTRIS, Bach.

Prairie Hare.

Lepus campestris, BACH., J. A. N. Sc. Phila. VII, II, 1837, 349.—IB. VIII, I, 1839, 80.
BAIRD, Gen. Rep. Mammals, 1857, 585.
Lepus townsendii, BACHMAN, J. A. N. Sc. Phila. VIII, I, 90; pl. ii.
AUD. & BACH., N. Am. Quad. I, 1849, 25; pl. iii.
Lepus virginianus, RICH., F. B. Am. I, 1829, 224.

SP. CH.—Larger than *Lepus americanus*. Ears about one-fifth longer than the head. Fur soft and full, especially in winter. Tail as long as the head. Hind feet considerably longer than the head; somewhat longer than the ears.

In summer, back, rump, sides of limbs, external and internal bands of the ear, and the throat, yellowish grey, varied more or less with brown. Beneath white. Tail entirely white, above and below; in some specimens only with a faint wash of ash above. Nape and interior surface of ears white, except as stated; the latter tipped with black.

In winter, pure white all over, with a yellowish tinge. Ears white, tipped with brown; the external and internal bands rusty grey. Fur on the ears and elsewhere much longer and fuller than in summer. Fur on the upper part and sides pure white on the basal half.

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The prairie or Townsend's hare is unknown in the valleys of California, though we found it a short distance south of the parallel of 42°, so that it may be said to inhabit that State. In the upper part of the Sacramento valley, and even in the hills northeast of Fort Reading, we found the "jackass rabbit" (*L. californicus*) everywhere abundant, the only *hare*, in the common acceptation of the term, known to exist there—*L. artemisiae, audubonii, and trowbridgii*, being all called rabbits. Crossing the "divide" near Lassen's butte, and coming down into the interior or Klamath basin, on the upper branches of Pit river, we lost sight of the Californian hare, to see no more of it till our return south, months afterwards. In its place, another species, almost as large, and quite as handsome, but of a bluish grey, instead of a reddish brown, began to be occasionally seen, at first very rarely, afterwards oftener, as we approached the Columbia, but never anywhere in the region we visited becoming so abundant as the Californian hare in some parts of its habitat.

I saw the first individual of this species on the shores of Wright lake. As we descended from a line of hills toward the water, a sort of stampede took place among the game of all kinds, which had congregated from a vast region of now barren or burned prairie and mountain. The air was filled with flocks of birds, ducks, waders, grouse and quails; while the guns were popping in all directions. Among the animals which fled, alarmed by those before me, I noticed a large blue-grey hare, entirely unlike anything I had before seen, running up the hill toward me. Forgetful of my horse, and of my own fatigue, and only anxious to secure the prize, I galloped around a knoll on my right to intercept him. When I crossed his track, however, he was far away, and running at a speed which, familiar as I was with the Californian hare, astonished me. This was *Townsend's hare*, further south than it had before been noticed, and near the southern limit of its range. A few days afterward Mr. Anderson shot one on the shores of Great Klamath lake, which I preserved.

The flesh of Townsend's hare, when fat, is excellent; and though living among the sage bushes, I did not notice that it had contracted any bitterness, as does the large grouse (*T. urophasianus*) which inhabits the same regions. And yet it is difficult to imagine what they can find to eat, unless it is the artemisia, for that is almost the only green thing in some localities where they are found.

All the specimens I saw of this species had the colors I have assigned to it. This was, however, as I suppose, only the summer coat. In the winter it is said to become white; in that respect differing from the Californian hare.

LEPUS CALIFORNICUS, Gray.

California Hare.

Lepus californicus, Gray, Charlesw. Mag. N. H. I, 1837, 586, (named only in Pr. Zool. Soc. Lond. IV, 1836, 88.
Aud. & Bach. N. Am. Quad. III, 1853, 53; pl. cxii.
Baird, Gen. Rep. Mammals, 1857, 594.
? Lepus richardsonii, Bach. J. A. N. Sc. VIII, 1, 1839, 88.
Wagner, Suppl. Schreb. IV, 1844, 111.
Lepus bennettii, Gray, Zool. Sulphur, Mamm. 1844, 35; pl. xiv. (In color rather nearer *L. californicus*.)

Sp. Ch.—Size large. Ears and hind feet much longer than the head, (the ears longest.) Tail as long as the head. Limbs elongated, not very densely furred. Fur rather soft. Upper parts light cinnamon and black. Sides of the body anteriorly, chest, and outer surfaces of limbs cinnamon, with a slight mixture of black. Under parts whitish cinnamon on the median line, darker externally and on the inner surfaces of the limbs. Tail dull cinnamon, the upper part and a line running up a short distance on the rump, black. Extremity of the dorsal surface of the ear, with the adjacent edges, black. Internal and external bands dusky; rest of the dorsal surface of the ear, with the posterior edge, fulvous white; rest of the external surface, with the anterior fringe, pale cinnamon. Under surface of the head lighter than the chest. Bases of the hairs and fur above, greyish white; below, white; on the sides, light plumbeous. Nape, dusky greyish.

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In the open country of California, either in the meadow-like plains of the valleys, or in the low hills sprinkled with oaks and clumps of "greasewood," this beautiful hare, familiarly known as the "jackass rabbit," is exceedingly common. In favorite localities, some miles from the "ranchos," in the Sacramento valley, I have sometimes seen a half dozen of them, in the morning, sporting together. Like most hares and rabbits, however, it is for the most part nocturnal in its habits, and is not often seen during the heat of the day, unless driven from its form by some alarm. It has received its common name from the enormous size of its ears, which, in some individuals that I have seen, were full seven inches in length, a size which seems ludicrously disproportionate, and when the animal runs is sure to excite laughter in one who sees it for the first time. As might be inferred from this immense auditory apparatus, the Californian hare is exceedingly timid; and were it not that he is also particularly stupid, his long ears and long legs would generally keep him out of the range of the sportsman's gun. As it is, they are killed in great numbers, and the markets of the towns are, at the proper season, well supplied with them. When fat, they are excellent eating, fully equal to any of the leporine quadrupeds.

While we were encamped at Fort Reading, California, these hares were quite numerous on the prairie near the post, and it was a favorite amusement with the members of our party to hunt them. On a surface nearly without cover it would seem hopeless to attempt to shoot animals so shy and fleet, but, fortunately, when alarmed, they were nearly as likely to run towards the hunter as from him, and so were sometimes killed.

The prevailing colors of the Californian hare are a rich chestnut brown in winter, and a lighter yellowish brown in summer, being nearly the same with those of the black-tailed deer which inhabits the same territory, and, like that deer, too, its most conspicuous mark is a black tail. It closely resembles the Texan hare (*L. callotis*) in size and color; but it is quite certain that the two species are distinct.

Like the Columbian black-tailed deer, the Californian hare is confined to the westward of the Cascade range and of the Sierra Nevada, inhabiting the valleys of California generally, and near the coast being found as far north as the Oregon line.

LEPUS ARTEMISIA, Bachman.

Sage Rabbit.

Lepus artemisia, Bachman, J. A. N. Sc. Phila. VIII, 1, 1839, 94.—Ib. in Townsend's Narrative, 1839, 329.
Waterhouse, Nat. Hist. Mamm. II, 1848, 126.
Aud. & Bach. N. Am. Quad. II, 1851, 272; pl. lxxxviii.
Baird, Gen. Rep. Mammals, 1857, 602.
Lepus artemisiacus, (Bach.) Wagner, Suppl. Schreber, IV, 1844, 114.
? Lepus nuttalli, Bach. J. A. N. Sc. Phila. VII, 1837, 345; pl. xxii.—Ib. VIII, 1839, 79.—Ib. Townsend's Narr.

Sp. Ch.—Among the smallest of the American rabbits; considerably less than *L. sylvaticus*. Ears about as long as the head. Tail moderate. Hind feet longer than the head; very densely padded. Fur soft and full. Above mixed black and brownish white; the black much developed posteriorly. Sides rather paler. Thighs and rump grey. Tail above like the back. Back of the neck and fore legs rust color. Throat and sides of the neck with a tinge of pale rusty; along the edge of the abdomen this color concentrated almost into a lateral stripe; paler than the back of the neck. Edge of the ear whitish; external and internal bands greyish brown. The internal face rusty at base, then hoary, as on the exterior, for much of the surface. A narrow margin of black along the tip. Fur nowhere passing from the basal lead color to dark brown without an intermediate bar of yellowish brown.

The sage rabbit has, perhaps, the widest range of all the American species of the genus. Throughout the open country between San Francisco and the Columbia river we found it the

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most common species. Near San Francisco it is less abundant than Trowbridge's and Audubon's rabbits and the Californian hare, but as we proceeded to the north we left these species behind us—the first two immediately after quitting Benicia, the last in the hills of northern California—while the sage rabbit continued with us into a new zoological district, where nearly all his associates were different from those below. From the Cascade mountains it ranges eastward nearly to the Mississippi.

The sage rabbit is considerably smaller than the common grey rabbit of the eastern States, and his color is generally lighter, rather a blue than red grey, with a characteristic patch of light red thin fur on the nape of the neck. They are very numerous on the sage plains, and are hunted by foxes, coyotes, eagles, hawks, owls, and Indians.

I obtained a fine specimen on the extreme headwaters of the Willamette river, at an elevation of about 5,000 feet, which had been struck by hawk or owl and killed, but the murderer had left him, perhaps frightened off at our approach. The flesh of the sage rabbit is white and good, not at all flavored by the *artemisia* among which he lives.

Specimens were collected on Rhett and Klamath lakes.

LEPUS AUDUBONII, Baird.

Audubon's Hare.

BAIRD, Gen. Rep. Mammals, 1857, 608.

SP. CH.—Size a little less than that of *L. sylvaticus*. Ears longer than the head. Hind feet rather short, longer than the ears; fully furred beneath. Tail rather long. Above, mixed yellowish brown and black, paler on the sides and throat. Beneath, pure white. Thighs and rump greyish. Back of neck rusty; fore legs somewhat similar. Hairs lead color at the base, on the middle of the back, (over the loins,) passing directly through dark brown to black, then yellowish brown; on the sides, rump, and fore part of back, the passage into the first brown or black ring is through greyish, yellowish, or reddish brown.

This handsome hare is widely distributed over the west. It is the largest of the "rabbits" of California, considerably exceeding in size the artemisia and Trowbridge's. It is killed somewhat abundantly in the hills bordering the Sacramento valley, and is usually to be found in the market of San Francisco, where I obtained specimens.

It is about the size of the grey rabbit of the east, (*L. sylvaticus*,) and the colors are similar, though that of Audubon's hare may be called a yellowish, while that of the eastern rabbit is a brownish, grey.

LEPUS TROWBRIDGII, Baird.

Lepus trowbridgii, BAIRD, Pr. A. N. Sc. Phila. VII, April, 1855, 333.—IB. Gen. Rep. Mammals, 1857, 610.

SP. CH.—Size small, less that of *L. audubonii*. Head small. Ears about equal to it in length. Tail very short, almost rudimentary; hind feet very short, well furred, considerably shorter than the head. Color above, yellowish brown and dark brown; beneath, plumbeous grey. Sides not conspicuously different from the back, but paler. Back of neck pale rusty. Ears greyish and black on the external band; ashy grey elsewhere, with little indication of darker margin or tip.

This pretty rabbit was first obtained by Lieut. Trowbridge, U. S. A., a gentleman who has done, perhaps, more than any other individual to develop the natural history of the Pacific coast, and to him Professor Baird has very appropriately dedicated the species. This species is quite common in the market of San Francisco, being killed in that vicinity, and is the smallest of all the rabbits which are found there. It is readily distinguishable by the remarkable shortness of its legs; its colors are darker than those of Bachman's hare or the sage rabbit, and there can be no doubt that it is a perfectly distinct species. Of its habits I could learn nothing of interest. I saw it frequently in the scattered bushes on the sand hills back of the city of San Francisco, where it resembled in movements and appearance the immature *L. sylvaticus*.

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Of its distribution I can say little. To the northward from San Francisco we did not find it, and its range is probably rather south than north of that point.

Our specimens were obtained in the markets of San Francisco.

ALCE AMERICANUS, Jardine.

The Moose.

BAIRD, Gen. Rep. Mammals, 1857, 631.

The moose does not exist in any part of California or Oregon Territory, and the Columbia river may be said to form the southern limit of its range west of the Rocky mountains. We saw the horns of moose killed in Washington Territory, but could not learn from the whites or Indians that any had ever been killed south of the river.

This is one of several animals common to the two sides of the continent, such as the elk, black bear, large grey wolf, grey fox, beaver, mink, &c., which have so much of a northern habitat as to permit them to inhabit the entire breadth of the continent north of that great barrier to smaller and more southern species of mammals and birds, the great basin and the wide-spread desert of the upper Missouri, Yellowstone, and Platte.

A similar inosculation of the faunae of the east and west takes place in northern Mexico, south of the great basin, where the bassaris, the black-footed raccoon, the Texan skunk, &c., with a great number of birds, are found quite across from Texas into California.

CERVUS CANADENSIS, Erxl.

Elk.

BAIRD, Gen. Rep. Mammals, 1857, 537.

The elk was once perhaps more widely distributed over the North American continent than any other quadruped; it existed throughout the entire territory lying between the northern provinces of Mexico and Hudson's bay, and between the Atlantic and Pacific oceans. Within the United States east of the Mississippi very few are left, except in the region bordering Lake Superior. On the western tributaries of the Mississippi it is still very common, and perhaps equally so in California and Oregon. West of the Rocky mountains, it was formerly most abundant in the valleys of California, where it is still far from rare. In the rich pasture lands of the San Joaquin and Sacramento, the old residents tell us, it formerly was to be seen in immense droves, and with the antelope, the black-tailed deer, the wild cattle, and mustangs, covered those plains with herds rivalling those of the bison east of the mountains, or of the antelope in south Africa.

The favorite haunts of the elk in California are the wide stretches of "tule" bordering the rivers and lakes of the valleys I have mentioned. It is said that, unlike most large quadrupeds, the elk can never be "bogged," and he traverses these marshy districts with a facility possessed by no other animal.

During the rutting season, when the bucks are rushing through the tule in search of the females, a common mode of hunting them is to mount a horse, and riding along the edge of the marshes to call the buck by an imitation of the cry of the doe. He comes plunging on his course, marked for a long way by the trembling rushes, till, led on by the fatal signal, he bursts out of the cover with streaming sides, and, tossing his antlers, looks around to find the object of his search. This is the moment improved by the hunter to plant in his shaggy breast the fatal bullet.

The elk of the western coast differs in nothing, so far as I could see, from that of the eastern States; unless it may be that in some localities it attains a larger size than any killed in the

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valley of the Mississippi. Near Humboldt bay elk are abundant, and I am assured by intelligent men that eight hundred, and even one thousand pounds is not an unusual weight, and that individuals have been killed there which are said to have weighed even twelve hundred pounds. Of those which I saw, however, either killed by our own party, or brought into the market of San Francisco, none weighed over about six hundred or seven hundred pounds; but we saw the tracks of elk in the Cascade mountains which were scarcely less in size than those of a bullock.

The flesh of the elk is certainly not so good as that of some others of the cervine quadrupeds, but still is far from bad. A large, though young and fat buck, killed by Lieut. Crook, U. S. A., afforded us venison which was tender, juicy, and very sweet.

CERVUS LEUCURUS, Doug.

White-Tailed Deer.

BAIRD, Gen. Rep. Mammals, 1857, 649.

While traversing the region in which this problematical species has been said to exist I was constantly on the lookout for facts or specimens which should decide the question of its right to be considered a distinct species; and although I was unsuccessful in obtaining evidence which will be considered conclusive for the solution of this problem, I was able to get such evidence in the case as to convince myself, at least, that the *Cervus leucurus* of Douglas, or, at least, the "white-tailed deer" of the upper Columbia, is nothing more nor less than our *Cervus virginianus*.

At our depot camp, on the south fork of the Des Chutes river, near where we first met with the mule deer, (*C. macrotis, Say,*) the first and only specimen of the white-tailed deer was killed by our hunters. This was a dappled fawn, in size and markings to our eyes undistinguishable from the young of the Virginian deer. The tail was not disproportionately long, was of a reddish brown above, and pure white below, the hair on its sides being longer, so as to give it greater relative breadth than in the mule deer or the Columbian black-tailed deer; and unlike the tail in both these species, there was not a black hair on any part of it. Subsequently, when ascending the main fork of the Des Chutes, we encamped, early in the day, in a thick clump of pines, in a bend of the river. After dinner I took my gun and fishing tackle and strolled along up the stream. I saw everywhere most abundant "sign" of beaver, which seemed to occupy both sides of the river in a continuous colony. I had caught specimens of the only fishes which seemed to inhabit that part of the stream, the western speckled trout, and a new white fish, (Coregonus,) now, for the first time, found on the Pacific slope. I had been sitting very quietly for a long time, watching the motions of a brood of young phalaropes which were sporting on the stream, when, chancing to turn my head, I saw in the centre of a small prairie, not more than seventy-five yards from me, a full grown white-tailed doe. She was entirely unaware of my presence. My view was quite unobstructed, and, since I had nothing but small shot in my gun, I contented myself with a careful examination of her form and markings. She was stepping slowly along, stopping at intervals, with head raised and ears turned forward, evidently attracted towards our camp, not far distant, but completely concealed by the trees, by sounds or scents, which excited at the same time her curiosity and her fears, these two emotions being vividly represented in her animated looks and movements, and presented a picture which everyone who has seen much of this timid, yet inquisitive animal will not fail to recall. It was late in August, (the 28th,) and she had not yet shed her summer coat, which was light fulvous above, whitish below; as a whole, much lighter than Audubon's figure, or the specimen in the collection of the Philadelphia academy, in both of which the coloring of the winter coat is seen.

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In size, the animal I was then observing considerably exceeded the only two specimens existing in collections, (both of which are immature,) being about that of the Virginian deer of the eastern States. I had been watching her for, perhaps, ten minutes, when I saw our guide, Bartee, approaching the prairie from the opposite side, with his rifle on his shoulder, and quite unconscious of the proximity of the game for which he had been searching. My motions to attract his attention alarmed the deer, and with a buck, which had been all the while still nearer me, she ran across the prarie, her broad white tail erect and swinging, and disappeared in the forest. The buck was larger than the doe, of the same color, with much curved, many pronged horns, and, like her, with a white tail, which did not seem disproportionately long.

We saw no more of the white-tailed deer. Among the many pairs of antlers of animals killed by the Indians which we noticed in the Des Chutes basin there were some twice forked horns, which I considered to be those of the mule deer, and others, more curved and many pronged, closely resembling horns of *C. virginianus*, which we supposed to be those of *C. leucurus*.

These facts, though not perfectly conclusive as to the existence or otherwise of such a species as *C. leucurus*, seem to indicate that the Virginian deer inhabits the western slope of the Rocky mountains with the mule deer, as they together inhabit the eastern slope of the same range, either as distinct from, or identical with, *C. leucurus*.

I will leave the discussion of this subject to others, to whom it more properly belongs, only suggesting that:

1st. *C. leucurus*, Douglas, is not now the most common species on the Willamette or Cowlitz rivers, as of those killed there by our party, or during our stay in that region, all were *C. Lewisii*, Peale, the Columbian black-tailed deer, and we were told that no other species was found there.

2d. Richardson never saw *C. virginianus* in the United States; and at the north, where he locates *C. leucurus*, now *C. virginianus* is found in abundance, and *C. leucurus* is unknown. We may, therefore, suspect that he has confounded them.

3d. Lewis and Clark considered the white-tailed deer of the west as a variety of *C. virginianus*.

4th. The two animals upon which Audubon's description is based are both young and, of necessity, small, and are in dark, winter pelage. The diagnostic characters which he gives are, small size, dark color above, light below, small size of gland of leg, tuft of white hair between legs, &c.; every character being presented by the young of the Virginian deer in their winter coat.

CERVUS MACROTIS, Say.

Mule Deer.

Cervus macrotis, Say, Narr. of Long's Exped. II, 1823, 88.
Baird, Gen. Rep. Mamms. 1857, 656.

Sp. Ch.—Larger than *C. virginianus*. Horns doubly dichotomous, the forks nearly equal. Ears nearly as long as the tail. Gland of hind leg half as long as the distance between the articulating surfaces of the bone.

Hair in winter, ashy brown with light grey tips and annulations. Beneath, like the back, except about axillae and groin. Entire rump with basal two-thirds of tail all round white. The tail is cylindrical, a little longer than the ears, very slender, naked beneath, except at the end, which is a black tuft.

When exploring the course of the Des Chutes river, Oregon Territory, in September, 1855, we followed up the main fork westwardly, to its source in the Cascade mountains. On this excursion we first met with the "mule deer." As we were, one morning, winding along the river bank, we saw a doe some distance before us go down to the water to drink. Our party stopped, while Bartee crept forward to get a shot. The deer drank hastily and started directly back up the hill by the path she had descended; fearing to lose sight of her, Bartee stopped her

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by a shout, when she turned her head directly toward him, and he fired at the distance of two hundred yards. The deer went crashing off through the brush, and as we had plainly seen the plash of the ball in the water a long way beyond where she stood, we thought he had missed. Bartee, however, knew better what dependence to place on his eye and his Hawkins' rifle, and beckoning us to come on, he ran forward to take her trail. We followed, but with no great confidence of success. On reaching the trail, we found it blood-marked, and, before we had gone a dozen rods further, the wild death cry of the deer gave us the best possible evidence of the accuracy of Bartee's aim. When we reached the deer she was quite dead; the ball had entered the breast, traversing the lungs and the heart diagonally, and passed out near the last rib. It was a doe of rather large size, evidently suckling a fawn which she had left "cached" somewhere in the manzanita bushes; and, having gone to the river to drink, was returning with maternal haste to her charge, when the fatal bullet had deprived her of life. The incident suggested some sad reflections not readily dissipated by thoughts of our necessities, which had become pressing; but we were partially consoled by the assurance from Bartee that fawns, at that season, were old enough to shift for themselves.

This deer was new to me, and entirely different from any I had seen in California, as well as from the Virginian deer of the eastern States. From my notes, made at the time, I take the following description:

Wednesday, August 29.—Bartee killed suckling doe of rather large size, compared with Californian deer. Ears very large, (eight inches long,) rump sloping. Shedding summer coat, composed of long, coarse, reddish brown hair, which was of much the character of the hair of the antelope, like threads cut short off. Under coat soft and fine, of a bluish grey; white patch on rump, like that on antelope, but less broad. Tail of moderate length, (nine inches,) reddish-brown on top, white on sides, and black at tip, without hair below. Gland of hind legs very long. Though animal was poor, the flesh was very tender and well flavored.

This, though so great a novelty to the Californians of our party that they suggested that it must be a hybrid between the antelope and the Californian black-tailed deer, was the mule deer, *Cervus macrotis*, Say. I was then with a detachment detailed for a special purpose, and had no antiseptics for the preservation of the skin, and the zoologist of our party was in our depot camp. I carried the skin until it began to decompose, and I was obliged to content myself with the head and skin of head, legs and tail. These I preserved, and they coincide with Say's description of those parts in the mule deer of the upper Missouri.

The physical geography of the Des Chutes basin unites that territory to the Rocky mountain desert, and its fauna generally will be found to have greater affinity with that of the Rocky mountains and upper Missouri than with that of California. It is not surprising, therefore, that we find *C. macrotis* westward to the base of the Cascade mountains, or, in other words, to the base of the wall which forms the western limit to the enclosure of the interior basin.

CERVUS COLUMBIANUS, Rich.

Black-tailed Deer.

Cervus macrotis, var. *columbianus*, RICHARDSON, F. B. Am. I, 1829, 255; pl. xx.

Cervus columbianus, BAIRD, Gen. Rep. Mammals, 1857, 659.

Cervus macrotis, RICH. F. Bor. Am. I, 1829, 254; pl. xx.

Cervus lewisii, PEALE, Mammalia and Birds U. S. Ex. Ex. 1848, 39.

Cervus Richardsonii, AUD. & BACH. N. Am. Quad. II, 1851, 211.—IB. III, 1853, 27; pl. cvi.

? *Cervus (Cariacas) punctulatus*, GRAY, Pr. Zool. Soc. Lond. XVIII, 1850, 239; pl. xxviii.—IB. Knowsley Menag. 1850, 67.

Black-tailed fallow deer, LEWIS & CLARK.

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Sp. Ch.—About the size of *C. virginianus*, or less. Horns doubly dichotomous, the forks nearly equal. Ears more than half the length of the tail. Gland of the hind leg about one-sixth of the distance between the articulating surfaces of the bone. Tail cylindrical, hairy and white beneath; almost entirely black above. The under portion of the tip not black. Winter coat with distinct yellowish chestnut annulation on a dark ground. Without white patch on the buttocks. There is a distinct dusky horse-shoe mark on the forehead anterior to the eyes.

The Columbian black-tailed deer is found in all parts of California, and is the only species of which I could get any definite information in that State. Of the deer which I saw in California, living and dead, amounting to some hundreds, all were unmistakably of this species. The general colors, as given by Audubon, the black crescent on the forehead, the slender, dichotomous horns of the male, the tail black above and white below, and not like that of the Virginian deer elevated in running, but carried down and invisible—all served to mark the species distinctly, and to separate this from any deer I had seen.

Near the coast the black-tailed deer probably extends to the British possessions, as I have seen specimens from Cape Flattery and Puget's Sound, where it is common. It is also very abundant in the Willamette valley, as well as in the valleys of the Umpqua and Rogue rivers. To the eastward of the Cascade range it is rarely if ever seen, being there replaced by the mule deer (*C. macrotis*) and the white-tailed deer (*C. virginianus?*) In the interior basin, through which the Des Chutes river flows, and on the eastern slope of the Cascades, a region comparatively dry, sterile, and, in summer, hot, we found only the mule and white-tailed deers; and in crossing the Cascade range, we found only the Columbian black-tailed deer, and that very abundant.

In size this species perhaps somewhat exceeds *C. virginianus*, but the difference in that respect is not great. A full grown and fat buck will sometimes weigh two hundred pounds, but this is a very unusual size; the average weight of the buck may be set down at one hundred and twenty-five pounds; of the doe, at about one hundred pounds.

The flesh of those brought into the San Francisco market seemed to me dry and tasteless, and decidedly inferior to that of the Virginian deer, and such is, I think, the estimate generally put upon it by the inhabitants of that city; but a very large and fat buck, killed by our party on the shores of Klamath lake, furnished us with venison which we voted was as tender, juicy, and delicious as any we had ever tasted. It is barely possible, however, that abstinence and mountain air in some degree qualified our estimate of its excellence.

The colors of the black-tailed deer, of both the winter and summer coats, are brighter and handsomer than those of the eastern species.

The summer coat is composed of rather long and coarse hair, of a fulvous brown, approaching chestnut on the back; in the month of September this begins to come off, exposing what the hunters call "the blue coat," which is, at first, short, fine and silky, and of a bluish grey, afterwards becoming a chestnut brown, inclining to grey on the sides, and to black along the back. Audubon was evidently mistaken in saying that there was no glandular opening on the leg of this species, as I have found it a constant character in all the individuals which I examined in California with reference to this mark.

ANTILOCAPRA AMERICANA, Ord.

The Prong-horned Antelope.

Baird, Gen. Rep. Mammals, 1857, 666.

To any one who has "crossed the plains" the prong-horned antelope can be no stranger. Occupying the interior desert which lies between the "States" and California as its favorite

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place of abode; found abundantly, and, of game, almost exclusively on those arid and barren plains across which the path of the emigrant passes, it has often happened that the delicious venison of the antelope has been to the wayfarer not only a luxury, but for days and weeks a vital necessity.

Though found in nearly all parts of the territory of the United States west of the Mississippi, it is probably most numerous in the valley of the San Joaquin, California. There it is found in herds literally of thousands; and though much reduced in numbers by the war which is incessantly and remorselessly waged upon it, it is still so common that its flesh is cheaper and more abundant in the markets of the Californian cities than that of any other animal.

In the Sacramento valley they have become rare, and the few still remaining are excessively wild.

On nearly every day's march, between the valley of the Sacramento and the Columbia, we saw either the antelope itself or its peculiar track in the sand. This track differs so distinctly from that of the deer as to be recognizable at a glance. The point of the hoof is very sharp, while the hinder part of the foot is much expanded, and each half rounded posteriorly, so that the imprint of the entire hoof is elegantly cordate, the track of every species of deer being much narrower.

The antelope, though perhaps more fleet and timid than the deer, is not equally sagacious, and may sometimes be killed with surprising facility, as a single instance will serve to illustrate: At the southern end of Klamath marsh, near a splendid spring, we remained to give our animals the benefit of the good water and the fine pasturage of clover and bunch grass. We had been traversing a region occupied by great numbers of Indians, who had rendered the game very scarce, and we had been unable to obtain any fresh meat for some time. In these circumstances, Bartee, our guide, to whom a want of venison was intolerable, mounted his mare and started off, vowing that he would not return without deer or antelope. The sun was just setting, and we began to despair of our hoped-for supper of venison, when a shout from our packers, who were out picketing the mules, attracted our attention, and we soon saw the old man, who seldom hunts in vain, slowly emerging from the forest leading his horse, which was loaded with four antelope. His story was this: He had made a wide circuit without finding game, and while on his return, some five miles from camp, he had discovered through the trees a band of six antelope going to a spring to drink. Knowing they would return the same way, he concealed himself, and, as they approached, shot the leader of the band. The remainder seemed somewhat surprised, stopped, and looked around, but soon resumed their march. Bartee was ready and fired again, killing another. While he remained concealed, they were simply confused by the firing, and did not offer to run away. In this manner he killed five of the six, when, knowing that he had as much venison as his horse could carry, he spared the other, which ran off only when he came up to disembowel those he had killed.

The flesh of a young and fat antelope is delicious, but that of the older bucks is strong. The head of an antelope baked in the ground is regarded as a great delicacy, but to me it has an earthy taste that is far from pleasant.

The hair of the antelope is very peculiar, having as a general characteristic a peculiarity noticed in some portions of the hair of the elk, Rocky mountain sheep, and mule deer. It is tubular, and exceedingly light and spongy; indeed, so unlike the hair of most animals, that we hesitate to call it hair, and instinctively compare it with the quills of the porcupine, from which, however, it differs by an entire want of rigidity and acuteness.

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OVIS MONTANA, Cuvier.

The Rocky Mountain Sheep.

BAIRD, Gen. Rep. Mammals, 1857, 673.

The Rocky mountain sheep is found at two points in the vicinity of our line of march from San Francisco to the Dalles of the Columbia, viz: at Shasta Butte and on the rocky hills about Rhett and Wright lakes, latitude 42°.

On the slopes and shoulders of Mount Shasta the *Ovis montana* exists in large numbers; so much so that one spur of the mountain has been named "Sheep Rock," and there hunters are always sure of finding them. It is said that the Rocky mountain goat is also to be found there, but of that I have very great doubts.

About Rhett lake I was much surprised to find the big-horn, as this sheep is there called, for the country, though rough and rocky, has very few high mountains. During the dry season, however, when much of the pasturage of the country has been burned off, and when most of the streams are dry, and water has become confined to oases in the desert, there is a great concentration of animal life in the vicinity of Wright and Rhett lakes. When we passed them in August, deer, antelope, elk, rabbits, grouse, water fowl, and waders, were exceedingly abundant, and with other animals was the Rocky mountain sheep. We saw them, but killed none; as always happens in such cases, when they came within shot no one had a gun at hand to shoot them. We, however, found their immense horns lying on the ground, and in them had conclusive evidence of their habitual presence in that locality.

In skins of the big-horn brought from the head of Salmon river by Lieutenant Day's party, I observed a peculiarity which has not been so marked in the other skins which I have seen. On the back and shoulders was a fine soft fur, which generally lies close to the skin and scarcely observable; when drawn out it forms a staple of from two to three inches in length, finer than the finest Saxony wool; while the remainder of the hair is particularly coarse and spongy, like that of the antelope.

BOS AMERICANUS, Gmelin.

The Buffalo.

BAIRD, Gen. Rep. Mammals, 1857, 682.

It will, perhaps, excite some surprise that I include the buffalo in the fauna of our Pacific States, as it is a common opinion that the buffalo is, and has always been, confined to the Atlantic slope of the Rocky mountains. This is not true; and it is to correct this impression that this note is made.

The range of the buffalo does not *now* extend beyond the Rocky mountains, but there are many Indian hunters who have killed them in great numbers to the west of the mountains, on the headwaters of Salmon river, one of the tributaries of the Columbia.

While I was at the Dalles, the party of Lieut. Day, U. S. A., came in from an expedition to the upper Salmon river, and I was assured by the officers that they had not only seen Indians who claimed to have killed buffalo there, but that, in many places, great numbers of buffalo skulls were still lying on the prairie.

This is another instance of the penetration of animals, characteristic of the upper Missouri, through into the basin lying between the Rocky mountains and Cascades. The mule and white-tailed (Virginian?) deer, the muskrat, Townsend's hare, the striped spermophile, (*S. lateralis*,) &c., seem to indicate that the Cascades present a more formidable barrier for the limitation of species than the Rocky mountain chain.

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CHAPTER II.

REPORT UPON THE BIRDS.*

CATHARTES CALIFORNIANUS.

Californian Vulture.

A portion of every day's experience in our march through the Sacramento valley was a pleasure in watching the graceful evolutions of this splendid bird. Its colors are pleasing; the head orange, body black, with wings brown and white and black, while its flight is easy and effortless, almost beyond that of any other bird. As I sometimes recall the characteristic scenery of California, those interminable stretches of waving grain, with, here and there, between the rounded hills, orchard-like clumps of oak, a scene so solitary and yet so home-like, over these oat-covered plains and slopes, golden yellow in the sunshine, always floats the shadow of the vulture.

This vulture, though common in California, is much more shy and difficult to shoot than its associate, the turkey buzzard, (*C. aura,*) and is never seen in such numbers or exhibiting such familiarity as the two species, *C. aura* and *C. atratus,* the efficient scavengers which swarm in our southern cities. We had, however, on our first entrance into the field, many opportunities of shooting this bird, but were unwilling to burden ourselves with it. After we left the Sacramento valley, we saw very few in the Klamath basin, and none within the limits of Oregon. It is sometimes found there, but much more rarely than in California. In size, the Californian vulture is second only to the condor, attaining a length of four feet, and a stretch of wing of ten feet, or more. A fine specimen was presented to Dr. Sterling on his return to San Francisco, and was for some time kept alive. He succeeded, however, in tearing from his legs the cord which confined him, and escaped. He ate freely the meat given him, and was a magnificent bird.

CATHARTES AURA.

The Turkey Buzzard.

As in all other parts of the United States, the turkey buzzard is found in California and Oregon. Not, perhaps, anywhere collected in as large numbers as are sometimes seen in the more southern of the eastern States; the paucity of animal life being the probable cause of its rarity; yet in the vicinity of the towns and about the great rivers it is quite common.

In the Klamath basin it is more rare; that dry and sterile region affording few attractions

* As the final determination of the species of birds collected by the expedition has not yet been completed by Prof. Baird, the names here given are to be considered merely as temporary. In his general report upon the birds of the Pacific Railroad Surveys, hereafter to appear, the names and pages of the species in this article will all be carefully quoted, and any errors of determination thus rectified.

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for it; and on the Des Chutes we saw scarce any of them; but on the Columbia their numbers increase, and below the Cascades they were very plenty.

For the purpose of examining this bird in California, to determine for myself its identity or otherwise with the turkey buzzard of the east, I took occasion to shoot one which was flying over us in the upper part of the Sacramento valley. He made no motion indicating that he had been struck by my shot, but sailed on with widely expanded and motionless wings as before. Gradually, however, he began to descend in wide and regular circles, till, finally, without a wing-flap, he settled as lightly as a feather on the prairie and remained motionless.

I went to him, and found him resting in the grass, his wings still widely and evenly expanded, but the head drooping and life extinct. It was a male, large, in fine plumage, and apparently identical with ours; then, too late, I regretted that I had been the cause of a death so calm and dignified.

HYPOTRIORCHIS COLUMBARIUS.

The Pigeon Hawk.

The pigeon hawk is common about San Francisco, where I obtained specimens, and also at San José, where it was obtained by Dr. Cooper.

We found it paired and nesting about the Klamath lakes, and it likewise occupies all the region south of the Columbia, in Oregon.

TINNUNCULUS SPARVERIUS.

The Sparrow Hawk.

Like the last, this little hawk is spread over the entire western coast. In the Sacramento valley, in the interior basin, and in the mountains and valleys of Oregon, we found it everywhere quite as abundant as in the eastern States.

In the Sacramento valley I once saw a hard fought battle between a sparrow hawk and a yellow-billed magpie; unfortunately I could not stay to see the conflict ended.

ASTUR COOPERI.

Cooper's Hawk.

Common about San Francisco and Benicia, and extending north of the Columbia.

ASTUR ATRICAPILLUS.

Goshawk.

This hawk is not uncommon about San Francisco and in southern California. We saw it but rarely on our march northward, yet I think its range extends to the Columbia.

ACCIPITER FUSCUS.

The Sharpshin Hawk.

Common in California—San Francisco, Sacramento valley, San Diego. (Lieut. Trowbridge.)

CIRCUS HUDSONIUS.

The Marsh Hawk.

This bird is rather common in the Sacramento valley, and abundant beyond all parallel on the plain of upper Pit river. I presume I saw several hundred marsh hawks, in a day's march,

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crossing the level prairie above the upper cañon of that stream. They were either flying over the prairie or along the stream, or sitting in pairs on the abrupt bank of the river, feeding on frogs, snakes, and mice. The range of the species extends north as far as the Columbia, and perhaps beyond.

BUTEO MONTANUS.

Western Red-Tailed Hawk.

We found this bird on the upper Sacramento, Pit river, and in the Cascade mountains of Oregon. I also saw specimens from Shoalwater bay, W. T., and San José, California, procured by Dr. Cooper; so that it may be said to inhabit all portions of our Pacific possessions.

BUTEO ELEGANS?

Red-Breasted Buzzard.

This hawk is common in those parts of northern California and eastern Oregon traversed by our party.

HALIÆTUS LEUCOCEPHALUS.

The Bald Eagle.

The bald eagle throughout the far west reigns monarch of the feathered tribes. It is not rare in California, along the Sacramento and San Joaquin rivers; is very common at the Cascades of the Columbia and at the Falls of the Willamette, Oregon, and still more abundant about the chain of lakes which cover so large a surface in the Klamath basin. We found it in the Cascade range, among the mountain lakes, and, indeed, in all places where fish, its favorite food, is attainable.

On the shores of upper Klamath lake, quite to my regret, a large number of these noble birds were shot by our party. So long, century after century, parent and offspring, had they reigned there in undisputed supremacy, with no enemy more formidable than the arrow-armed Indian, of whose missiles they had learned the range, that they exhibited little of the shyness so characteristic of the tribe to which they belong. On some point of rock, or dwarfed pine, projecting from the wall of trap which, to the height of 1,000 feet, borders the eastern shore of the lake, beyond bow shot, the bald eagles sat, and viewed our approach with calm indifference, permitting themselves to be brought within easy range of the rifles, and, too many of them, falling a sacrifice to man's passion for doing what he can, simply because he can.

The favorite fishing places of the eagles are the ripples, or rapids, of the streams, where fish, particularly salmon, lying or passing in shoal water, come within reach of their talons. At the rapids below the Falls of the Willamette a number of bald eagles may always be seen procuring their food.

The quills of this bird make better pens than those of any other I have ever seen.

PANDION CAROLINENSIS.

The Fish Hawk.

The fish hawk pursues its finny prey on all the streams and lakes of California and Oregon. Along the Sacramento it is associated with a great number of aquatic birds, cormorants, gulls, terns, &c., some of which seem strangely out of place so far inland, and after leaving all other

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fishing birds behind us, far up on Pit river, around the Klamath lakes, in the Cascade mountains, on the Columbia and Willamette, we still found the fish hawk, and his more powerful, but less skilful rival, the bald eagle. In the month of August we saw, in the Klamath basin, several pairs of fish hawks feeding their young, which were still in the nest, though, apparently, nearly old enough to leave it.

In the Cascade mountains we found the fish hawk, where it must have subsisted alone on fish taken from the small, rapid, trout streams; while in other localities it seeks its food in deep and wide bodies of water.

STRIX PRATINCOLA.

Barn Owl.

This owl is apparently more abundant on the western coast than in the eastern States, and more common in California than in Oregon. It is more frequently met with about San Francisco, San Diego, and Monterey, than any other species. Its habits at the west are similar to those of the eastern owls of the same species, occupying barns, out-houses, churches, &c., and, in the absence of these places of resort, living in hollow trees and holes in cliffs. I found it on San Pablo bay inhabiting holes in the perpendicular cliffs bordering the south shore. It also inhabits the Klamath basin, though apparently not in great numbers.

BUBO VIRGINIANUS, Var.?

The Great Horned Owl.

The great horned owl is one of the most widely distributed of American birds. Though less abundant than in the forests of the eastern States and Mississippi valley, it is still quite common in all parts of California, Oregon, and Washington. The specimen brought in was killed at Fort Reading by Dr. Hammond, U. S. A., who, while stationed at that post, very successfully investigated the natural history of the vicinity. I saw other specimens from southern California, and we were sometimes serenaded by its characteristic note while camping in the Cascade mountains.

BRACHYOTUS CASSINII.

Marsh Owl.

Found throughout California and Oregon, this species is especially common in the Klamath basin. On the level meadow-like prairies of upper Pit river we found it associated with the marsh hawk (*Circus hudsonius*) in considerable numbers. They were generally sitting concealed in the grass, and rose as we approached. I was much amused by the movements of one of these owls, at which I had fired unsuccessfully. A large number of hawks (*C. hudsonius*) and a large dark *Buteo* rose at the report of my gun, and flew about in circles, filling the air high over my head. The owl joined the crowd, and flew around as high and fast as the best. He was, however, evidently looked upon as an intruder, and when he came near a hawk in his circumvolutions he was sure to be buffetted; but as long as I could distinguish him, he was still sailing round among the hawks, badgered by all of them.

We found the same species again on the shores of Klamath lake and in the Des Chutes basin, among grass and sage bushes. In these localities it is very commonly associated with the burrowing owl, *Athene hypugæa*.

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SYRNIUM CINEREUM.

The Great Cinereous Owl.

This large and handsome owl is generally disseminated over the western part of the North American continent, at least we obtained proofs of its existence in the Sacramento valley, in the Cascade mountains, in the Des Chutes basin, and on the Columbia, in Oregon.

NYCTALE ACADICA.

The Acadian Owl.

This little owl is found in Oregon, but we saw nothing of it in California, where it is, however, said to exist.

ATHENE HYPUGÆA.

The Burrowing Owl.

The burrowing owl is found in many parts of California, where it shares the burrows of Beechey's and Douglas' spermophile. We found it in several places between San Francisco and Fort Reading, and again in the Klamath basin, though at the northward less frequently than in the Sacramento valley. South of San Francisco, they are found at San Diego and Monterey. We usually saw them standing at the entrance to their burrows. They often allowed us to approach within shot, and, before taking flight, twisted their heads about, and bowed with many ludicrous gestures, thus, apparently, aiding their imperfect sight and getting a better view of the intruder. When shot at and not killed, or when otherwise alarmed, they fly with an irregular, jerking motion, dropping down, much like a woodcock, at some other hole.

GLAUCIDIUM INFUSCATUM.

The Sparrow Owl.

I procured specimens of this diminutive owl on the Cascade mountains, in Oregon, where it is not very uncommon. It occurs also in California, for we saw several specimens in San Francisco, which had been obtained in that State, but we did not meet with it in the Sacramento valley. It is apparently, in a great measure, confined to wooded districts, which will account for our not finding it in the open country of California.

It flies about with great freedom and activity by day, pursuing the small birds, on which it subsists, apparently as little incommoded by the light as they are.

ANTROSTROMUS NUTTALLII.

Nuttall's Whip-poor-will.

This species is found in all parts of California and Oregon. On the shores of Rhett lake we came upon the nest of this bird, if nest it could be called, in which were two young ones nearly old enough to fly. The mother fluttered off as though disabled, by her cries and strange motions leading one of our party far down the hill-side, and away from her young; which done, she flew away well and swiftly, much to his surprise. Meantime we had found the pretty creatures for whom she had been so solicitous. They resembled the young of the eastern

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species, which I have often found in precisely similar circumstances. They were of a grey-brown color marbled with black, had large, dark, soft eyes, and were quite passive when caught. To the credit, be it said, of the rude men into whose hands they had fallen, their mild looks and silent appeals were not unheeded, and they were carefully deposited where they were found, with a kind wish that their mother might return to them.

CHORDEILES VIRGINIANUS.

The Night Hawk.

The night hawk is common in all parts of the country which we visited, lying between San Francisco and the Columbia. We saw it nearly every evening, and sometimes during the day, pursuing its insect food precisely as in the eastern States.

ACANTHYLIS VAUXII?

The Chimney Swallow.

The chimney swallow is common in California, but we saw nothing of it in Oregon. We, however, could obtain no specimens, owing to the height at which it generally flew.

HIRUNDO RUFA.

The Barn Swallow.

Not uncommon about houses and out-buildings in California and Oregon.

HIRUNDO LUNIFRONS.

The Cliff Swallow.

Common in Oregon and California. I found it nesting in the cliffs on the shore of San Pablo bay, and in the city of San Francisco, California, and it is quite abundant in the Willamette valley, in Oregon. In the sterile basin to the eastward of the Cascade Range swallows are much less numerous than in the fertile valleys near the coast. The insects, which form their food, are also noticeably rare in the interior, and the aggregate of animal life is in all departments small.

HIRUNDO BICOLOR.

The White-bellied Swallow.

Found in the vicinity of San Francisco, California.

HIRUNDO THALASSINA.

Violet Green Swallow.

Not uncommon in the valleys of California, and on the Columbia, in Oregon.

COTYLE RIPARIA.

The Bank Swallow.

Not uncommon throughout California. We occasionally saw this and the next species occupying their characteristic burrows. We probably sometimes confounded them, as they are only to be distinguished by careful inspection.

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COTYLE SERRIPENNIS.

The Rough-winged Swallow.

Found in California, and as far north as the Columbia river.

PROGNE PURPUREA, Linn.

The Purple Martin.

Not uncommon about San Francisco and the towns in the Sacramento valley.

PROGNE CHALYBEA.?

More abundant in California than the last, and commonly mistaken for it.

CERYLE ALCYON.

The Belted King Fisher.

Common throughout California and Oregon. Dr. Gambel restricts it to the rocky shores and islands near the coast, but we found it frequenting nearly every stream in our route from San Francisco to the Dalles.

CERTHIA AMERICANA.

The Brown Tree Creeper.

Common in the wooded districts throughout California and Oregon. On the upper Des Chutes in September, apparently migrating southward.

SELASPHORUS RUFUS.

The Nootka Humming Bird.

Occasionally seen in California and Oregon, and often associated with the last.

TROCHILUS ANNA.

Anna Humming Bird.

Abundant in California.

PARUS ATRICAPILLUS.?

The Black-capped Tit, or Chicadee.

Common throughout California and Oregon.

PARUS MONTANUS.

The Rocky Mountain Chicadee.

I saw what I supposed to be this bird feeding with the black-capped titmouse and *Sitta pygmea* among pine trees in the Des Chutes basin, in lat. 44° N., September, 1855.

SITTA CAROLINENSIS.

Carolina Nuthatch.

Common in the wooded districts of California and Oregon.

SITTA PYGMEA.

Pigmy Nuthatch.

This diminutive creeper we saw in most wooded places where water was near and any considerable amount of animal life was visible. We frequently, however, travelled for days through

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forests of yellow pine, where animal life was almost wholly wanting, and where no sounds, except those made by our party, or the mournful sighing of the wind in the tops of the pine trees, ever fell upon our ears. Through extensive districts, even the flutter and chirp of the omnipresent creeper was wanting; not even the hum of a solitary insect was heard; but everywhere a death-like monotony, a solitude and silence most depressing to the spirits and barren of results.

TROGLODYTES PALUSTRIS.

Marsh Wren.

We found the nests of this bird in the rushes on the shores of Rhett lake, and the bird in several marshes in California and Oregon.

TROGLODYTES BEWICKII.

Bewick's Wren.

Not uncommon in bushes and among fallen logs between Fort Reading and the Columbia. The "fallen timber" of the Oregon spruce forest districts, covered with the huge interlocked trunks of fallen trees, is a favorite habitat of this wren.

TROGLODYTES OBSOLETUS.

The Rock Wren.

This wren we found inhabiting piles of broken trap rock on the shores of the Klamath lakes, and on the Des Chutes river.

SIALIA OCCIDENTALIS.

The Western Blue-bird.

This interesting bird, one of the most striking of the many representative species which the eastern naturalist finds at the west, is nearly as abundant on the Pacific coast as the common blue-bird (*S. Wilsonii*) is in the valley of the Mississippi. It fills a corresponding place in the western fauna, and in all its habits is the counterpart of its eastern relative. The note and plumage are, however, slightly different, and yet so like, that, when camping on the Des Chutes, for months without a word from friends or home, I used to watch the blue-birds with peculiar interest as they came with characteristic familiarity about our camp; when all was quiet, dropping down from a hanging branch within ten feet of us, to pick up the crumbs scattered about the camp-fire, in all their movements and their soothing note recalling vividly the scenes of other years and distant lands.

CINCLUS AMERICANUS.

The American Dipper.

This singular little bird I found only in the rapid and shallow streams in the Cascade mountains. It was always flitting along in the bed of the stream, from time to time plunging into the water and disappearing, but soon reappearing across or up or down the stream, skipping from stone to stone, constantly in motion, jerking its tail and turning its body with much the manners of the wrens, occasionally uttering a short and sharp chirp.

The only specimen I obtained was killed September 12, and in my notes I find the following

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memorandum relating to it: * * * * * * "Female. Length $7\frac{1}{2}$. Alar extent, $11\frac{3}{4}$. Iris, brown · pupil, black."

TURDUS MIGRATORIUS.

The Robin.

The robin is, apparently, nowhere on the Pacific coast so abundant as in the eastern States, but is generally distributed over all the region west of the Rocky mountains. While traversing the Sacramento valley we saw none of these birds, meeting with the first only when we had been some weeks out, on Canoe creek, a tributary of Pit river. Subsequently we saw them frequently and most abundantly in the Willamette valley, near the Columbia.

TURDUS NÆVIUS.

Oregon Robin.

This robin-like bird we found associated in flocks, and having much the habits of *T. migratorius*, in the Cascade mountains, and on the hills bordering the Willamette valley, in Oregon, in October, 1855.

ICTERIA LONGICAUDA?

The Yellow-breasted Chat.

This pretty bird is found rather abundantly in the Sacramento valley, about San Francisco, and south of that city, in California, where it remains through the winter. In summer it ranges to the Columbia, and northward.

TYRANNULA SAYA.

Say's Fly Catcher.

Not uncommon throughout California and Oregon.

TYRANNULA NIGRICANS.

Black Fly Catcher.

Common in northern California. Specimens were also obtained in the Umpqua valley, Oregon.

TYRANNULA CINERASCENS.

Common about San Francisco, California, where it is probably frequently mistaken for *T. crinita*.

BOMBYCILLA CAROLINENSIS.

The Cedar Bird.

We saw the cedar bird on only one or two occasions, in small numbers, in the pine forests of Oregon.

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PTILIOGONYS TOWNSENDII.

This bird, like Maximilian's jay, we found only in the Des Chutes basin, though there it is very abundant.

It does not inhabit dense forests, nor prairies entirely destitute of trees, but chooses surfaces covered with a scattered growth of pine and cedar. We first met with it in the cañon of Mpto-ly-as river, at the base of Mount Jefferson.

As we picked our way with infinite difficulty down the side of this gorge, my attention was attracted by the delightful song of, to me, a new bird, of which a few were sitting in the pines and cedars which, by a precarious tenure, held a footing on the craggy face of the cliff.

The song, so clear, full, and melodious, seemed that of a *Mimus;* of the bird I could not see enough to judge of its affinities. The next day we followed down the river in the bottom of the cañon; all day the deep gorge was filled with a chorus of sweet sounds from hundreds and thousands of these birds, which, from their monotonous color, and their habit of sitting on the branch of a tree projecting into the void above the stream, or hanging from some beetling crag, and flying out in narrow circles after insects, precisely in the manner of the fly-catchers I was disposed to associate with them.

Two days afterward, in the cañon of Psuc-see-que creek, of which the terraced banks were sparsely set with low trees of the western cedar, (J. occidentalis,) I found these birds numerous, and had every opportunity of hearing and seeing them, watching them for hours while feeding and singing, and procuring specimens of both male and female. With the first dawn of day they began their songs, and at sunrise the valley was perfectly vocal with their notes. Never, anywhere, have I heard a more delightful chorus of bird music. Their song is not greatly varied, but all the notes are particularly clear and sweet, and the strain of pure, gushing melody is as spontaneous and inspiring as that of the song sparrow. At this time, September 30, these birds were feeding on the berries of the cedar; they were very shy, and could only be obtained by lying concealed in the vicinity of the trees which they frequented. I could detect no difference in the plumage of the sexes.

CORVUS CACALOTL.

The Raven.

The raven was a constant feature of the scenery in all parts of the country which we traversed. Even on the most sterile and inhospitable portions of the central desert, where heaven withholds her genial showers, and earth refuses every tribute to beauty or comfort, where stern and unrelenting sterility reigns supreme, and barren sands and rough and ragged rocks, bleached and burnt in the eternal blaze of a cloudless sun, sear the eye-ball, here, perched on some blasted pine, the presiding genius of the surrounding desolation, the raven always sat, and as we defiled past, over the trackless waste, gave us the malediction of his discordant croak.

CORVUS AMERICANUS.

The Common Crow.

Very abundant in the valley of the Sacramento; less common in the highlands and wooded districts of California; in the Klamath basin we did not see it, but it appeared again with the

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oaks on the Des Chutes river. There is, of course, no necessary connection between the distribution of the crows and the oaks, except that both prefer a country to a certain degree open and fertile; the association extends so far that we did not see crows except where some species of oak grew in greater or less abundance, the region of the pine forests, as well as that of the sage plains, being without them.

CORVUS OSSIFRAGUS.

The Fish Crow.

The fish crow I saw on the Willamette, Columbia, the coast, and about the bays of California, feeding upon dead fishes and mollusks.

PICICORVUS COLUMBIANUS.

Clarke's Crow.

This singular bird, the representative of the European nutcracker, (*Nucifraga caryocatactes*,) was rather common along a large portion of our route, and I was able to procure good specimens and study its habits at leisure. It is strictly confined to the highlands and mountains, never, where we saw it, descending to a lower altitude than about 4,000 feet. On the other hand, while crossing the Cascade mountains, at the line of perpetual snow, 7,000 feet above the sea level, I have seen this bird with Lewis and Clark's woodpecker, (*M. torquatus*,) flying over the snow covered peaks 3,000 feet above us. We first met with it in the spur of the Sierra Nevada, near Lassen's butte, and found it constantly, when in high and timbered regions, from there to the Columbia.

The habits of this bird are a compound, of about equal parts each, of those of the jays and woodpeckers. Its cry is particularly harsh and disagreeable, something like that of Steller's jay, but louder and more discordant. It has all the curiosity and all the shrewdness of jays or crows, and, from its shyness, is a difficult bird to shoot; indeed, I was never able to approach within shooting distance of one of them, but obtained my specimens by concealing myself, and waiting for them to "come round." Its flight resembles that of a woodpecker, and, perhaps from caution, it almost invariably alights on a dry tree. Even when going to the living tree, which furnishes it with its food, it always flys into another, a dry one, if one is near, first reconnoiters, and if the coast is clear begins to feed; but with the first movement of an intruder, without a note of any kind, it puts a safe distance between itself and its enemy.

The food of the nutcracker at the season when we visited its haunts was exclusively the seed of the yellow pine, (*P. ponderosa*,) in dislodging which from the cones containing it it displays great dexterity. Steller's jay and Maximilian's jay (*Gymnokitta cyanocephala*) were at the same time feeding on the same seeds, but not so exclusively.

GYMNOKITTA CYANOCEPHALA.

Prince Maximilian's Jay.

This jay, for a jay it is for all common purposes, and such I called it when we first found it, is limited, in the region traversed by our party, to the basin of the Des Chutes, in Oregon. The fauna and flora of this district, as well as all its climatic and geographic conditions, connect it with the central desert of the continent, a region lying along the

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Rocky mountains on either side, and characterized by an arid climate and sterile soil, by plains covered with artemisia and ridges of trap rock, on which grow the western cedar (*Juniperus occidentalis*) and the yellow pine (*P. brachyptera.*) The black-tailed deer, (*C. macrotis,*) the badger, (*T. labradoria,*) Townsend's hare, the little *Lagomys*, and striped spermophile are its most characteristic quadrupeds, and the sage hen, Townsend's Ptilogonys, and Prince Maximilian's jay some of its peculiar birds.

We first noticed this bird when in depot camp, in the southern part of the Des Chutes basin, latitude 44° 12′, in the month of September.

Early every morning flocks of from twenty-five to thirty individuals of Maximilian's jay came across, with the usual straggling flight of jays, chattering as they flew to the trees on a hill near camp, then, from tree to tree, they made their way to the stream to drink. Their note, when flying or feeding, was a frequently repeated *ca, ca, cā*, sometimes, when made by a straggler separated from mate or flock, rather loud and harsh, but usually soft and agreeable; when disturbed, their cry was harsher. They were very shy, and only to be shot by lying in wait and firing as they passed. Subsequently, on the banks of Psuc-see-que creek, fifty miles further north, I had an opportunity of seeing them feeding, and was able to watch them carefully and at my leisure. They were then feeding on the berries of the cedar, (*J. occidentalis,*) and in their habits and cries closely resembled the jays. A specimen previously killed had the œsophagus filled with the seeds of the yellow pine. From this I should infer that, like the jays, they are omnivorous. I could discern no difference between the male and female.

PICA HUDSONICA.

The Black-billed Magpie.

We saw none of these birds in California, though the other species was abundant; but first met with it on the banks of Mpto-ly-as river, a tributary of the Des Chutes, about one hundred miles south of the Columbia. Subsequently we saw them, occasionally, on the Columbia, but nowhere in great numbers. If my own observations were my only guide, I should say that it was less gregarious in habit than *P. Nuttalii*, for all the birds of this species which we noticed were solitary or in pairs, while the yellow-billed magpie is often seen in flocks of several hundreds.

Nearer the coast, the black-billed magpie ranges much lower than we saw it, coming into California and occupying, over a limited area, the same territory with the other species.

In the interior basin, to the eastward of the Sierra Nevada and Cascade mountains, we saw no magpie of either species. Like the crows, they shun so sterile a region, and we found them again, with the crows, on our northward march, when we came into a more productive district. This species seemed to me more shy than the other magpie of the west. Like all the corvidae, however, the magpies are shy and wary, or impudent and familiar, as the fit takes them, or perhaps as their necessities or fancies govern them.

PICA NUTTALLI.

The Yellow-billed Magpie.

This beautiful bird inhabits the valleys of California in great numbers, but, probably, never extends its range northward as far as the Oregon line, at least I could not learn that it had ever been seen so far north; and the other species (*P. hudsonica*) seems there entirely to replace it.

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The flocks of magpies sometimes seen in California are very large, containing hundreds of individuals. Their habits and manners betray distinctly their affinity to the crows as well as to the jays. All vociferous, petulant, mischievous, social, omnivorous, the unlettered observer groups these genera into one family from their habits, their flight, their attitudes, and their cries, as satisfactorily as the closet naturalist associates similarities of anatomical structure.

The American magpies resemble the European to a remarkable degree; and I recognized the magpie of California as a magpie, from his long tail and peculiar flight and cry, when too distant to distinguish his colors or form.

CYANOCITTA STELLERI.

Steller's Jay.

Steller's jay is, in size, form, and habits, the western representative of the blue jay (*C. cristata*) of the eastern States. Of a much deeper blue, and without the elegant variety of color which renders the blue jay one of the very handsomest of American birds, still, by the intensity of its tint, its more conspicuous crest, its bold, defiant air, and its excessively harsh and disagreeable cry, it challenges and secures attention and a certain amount of admiration.

It is almost exclusively confined to the hilly and mountainous districts, choosing in preference those covered with forests of pine. At certain seasons its food consists almost entirely of the seeds of the pine, particularly of *P. brachyptera*, which I have often seen them extracting from the cones, and with which the œsophagus of those we killed was usually filled.

This bird ranges at least as far north as the British line, and from the coast to the Rocky mountains. I brought in specimens from southern and northern California, Oregon, and Puget's Sound, the latter presented me by Lieutenant Trowbridge, United States army.

CYANOCITTA CALIFORNICA.

California Jay.

This is the first species of the genus which one sees on entering California by the way of San Francisco, and is the only jay known to many of the inhabitants of the valleys and open country. It occupies a lower altitude and a lower latitude than any other jay which we found in the region traversed by us.

The favorite haunts of the California jay are the trees and thickets bordering the streams in the valleys. As we ascended among the evergreen forests of the higher grounds, and passed northeasterly from the Sacramento valley, this bird left us, and long before reaching the line of Oregon we had lost sight of it entirely; nor did we find it again till our return to California months afterward.

The California jay has all the sprightliness and restlessness of the family, but is less noisy and its note is more agreeable than that of Steller's jay, (*C. Stellerii*,) which replaces it at the north.

PERISOREUS CANADENSIS.

The Canada Jay.

The Canada jay, or "whiskey jack," as he is familiarly called, descends much further to the southward on the Pacific side of the Rocky mountains than in the valley of the Mississippi. In California, we found them at the upper end of the Sacramento valley, in latitude 40°; while,

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in the eastern States, they rarely pass the line of 44°. This is the more surprising, as the climate still further magnifies the discrepancy, the isothermal line at Fort Reading, California, passing south of Cincinnati, Ohio. It is probable, however, that climate and temperature do not so much affect the range of this species as the presence or absence of the coniferous forests which form its favorite habitat.

As we progressed towards the Columbia, the Canada jay became more common, but always appeared to us as rather a shy bird, exhibiting none of the familiarity and impudence which have been ascribed to it, probably for the reason that our visit to that country was not in the winter, when they are made bold by hunger. I was informed that on the Columbia, when the ground is covered with snow, these birds become very fearless, obtrusive, and sometimes troublesome, through their depredations on the stores of provisions.

QUISCALUS PURPUREUS.

Common Blackbird.

Not uncommon in the vicinity of San Francisco, California.

SCOLECOPHAGUS MEXICANUS.

Blackbird.

Common in California and Oregon. I saw large flocks of them at Fort Vancouver, W. T., in the last of October. They were flying from field to field, and gathering into the large spruces about the fort, in the manner of all the blackbirds when on the eve of migration.

AGELAIUS XANTHOCEPHALUS.

Yellow-headed Blackbird.

Not uncommon in the Sacramento valley, especially during the fall and winter. We found them nesting, or, rather, with young—for the period of incubation had passed—at Pit river, and immense flocks of them swarmed in the rushes bordering the Klamath lakes.

AGELAIUS GUBERNATOR.

Red-wing Blackbird.

Very common about San Francisco and in the Sacramento valley; associated with *A. tricolor*.

AGELAIUS TRICOLOR.

Red and White-winged Blackbird.

Common in California, in the Klamath basin, and Oregon.

STURNELLA NEGLECTA.

Meadow Lark.

Meadow larks are more numerous in the Sacramento valley than in any portion of the eastern States, and are supposed by the residents to be identical with the common eastern species, (*S.*

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ludoviciana,) and they do indeed strongly resemble it in markings and habit. I have even seen prepared specimens of *Sturnella* from the Sacramento valley ticketed *S. ludoviciana* by ornithologists. I am, however, strongly persuaded that among the myriads of larks which we saw, and the dozens we shot in California and Oregon, not one was identical with the eastern species. Though the plumage is very like, and all the movements, attitudes and habits are similar, I regard the whole as a beautiful example of a *representative* species. Any one who has passed his years of boyhood in intimate companionship with the birds in the meadow, the orchard, and the forest, learns to recognize the notes of each familiar one as readily as he recognizes the voices of his family friends. Such an one, though he may be momentarily deceived by a familar look, will never fail to detect the voice of a stranger. I am certain I never heard the note of *S. ludoviciana* in California. There is probably still another species in California.

ICTERUS BULLOCKII.

Bullock's Oriole.

Common in the Sacramento valley, particularly in the trees bordering streams, and on river bottoms in summer.

CHRYSOMITRIS TRISTIS.

The Yellow Bird.

This pretty bird and sweet songster was a constant source of pleasure, and, with its familiar form and note, a solace of exile in the interior of California and Oregon, far from the haunts of men, when almost everything beside was new and strange. We found it quite common to the Columbia.

CHRYSOMITRIS PSALTRIA.

Western Goldfinch.

Common in the valleys of California.

LOXIA AMERICANA.

Cross-bill.

The little cross-bill is a constant feature of the pine forests of Oregon and northern California. Often the silence and solitude of an entire day's march through the sombre monotony of the forests of yellow pine were relieved only by the low but cheerful chirp of flocks of these birds. Around the rare and widely separated watering places at morning and evening they would gather in considerable numbers to drink.

I procured specimens of both sexes at the very source of the main branch of the Willamette river, in the Cascade mountains.

ZONOTRICHIA LEUCOPHRYS.

The White-crowned Finch.

This finch I found very abundant on the bush-covered sand hills about San Francisco; in November, and more rarely during the summer, in northern California and Oregon. The plumage and especially the note of the western bird seem to identify it with the white-crowned sparrow of the eastern States.

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ZONOTRICHIA AUROCAPILLA.

The Yellow-crowned Finch.

Abundant about San Francisco in winter.

ZONOTRICHIA GRAMINEA.

The Bay-winged Finch.

Common in the Sacramento valley, California.

SPIZELLA BREWERI.

Common in the Sacramento valley.

SPIZELLA SOCIALIS.

The Chipping Sparrow.

We saw this familiar sparrow occasionally in the Sacramento valley.

STRUTHUS OREGONUS.

The Western Snow Bird.

This bird we found very common in northern California and Oregon in summer, and about San Francisco in winter. In plumage and habits it so closely resembles its eastern representative as to lead me, for a long time, to consider them identical. The lonely valleys of the Cascade mountains contain large numbers of this little bird, having apparently the same habits as the eastern species.

CARPODACUS PURPUREUS.

The Purple Finch.

Common throughout California and Oregon.

CARPODACUS FRONTALIS.

Purple House Finch.

Common in the valleys of California.

OTOCORIS ALPESTRIS.

Sky Lark.

Very abundant in all the open country of California and Oregon. On the prairies of the Sacramento valley and of the Des Chutes basin, the shore larks, which rise before the traveller at every step and fill the air with their cheerful chirpings, recall the sky lark which so abounds on the moors and plains of Europe, and, by their numbers and their ceaseless twitter, give life to scenes as monotonous as the prairies of the west.

GUIRACA CŒRULEA.

The Blue Grosbeck.

This pretty and musical little bird we found only on Pit river, in northern California.

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PIPILO OREGONA.

The Ground Robin.

This bird, so like the eastern "towhee bunting," we saw very frequently after leaving the Sacramento valley. It seemed to become more abundant as we progressed toward the Columbia, and on the upper Des Chutes, and on the slopes of the Cascades it was as common as the *P. erythrophthalmus* in the wood lots at home. In its habits it resembles its eastern representative as closely as in its plumage.

PIPILO FUSCA.

The Cañon Finch.

Very common in the Sacramento valley, where it frequents the banks of streams and river bottoms, scratching about in the leaves under the bushes, as our other ground finches delight to do. This habit, as well as its long tail and jerking flight from one clump of bushes to the centre of another, indicated to me its affinities, though the bird was a stranger to me, and was almost entirely silent.

On the shores of upper Klamath lake, upon one occasion I saw what I supposed to be another species of *Pipilo*, but could not secure a specimen. In my notes of August 15th I made the entry: "Saw finch, size and habits of towhee bunting; ground color, lilac, with bars of white on wings and tail; very shy; did not hear its note."

PICUS HARRISII.

Harris' Woodpecker.

Not uncommon in the wooded districts of northern California and Oregon.

PICUS NUTTALLII.

Nuttall's Woodpecker.

Common in California.

PICUS GAIRDNERII.

Gairdner's Woodpecker.

Very common in northern California and Oregon.

PICUS WILLIAMSONII.

Williamson's Woodpecker.

The only specimen which I saw of this new bird I killed in the pine forest bordering upper Klamath lake on the east. Its habits are apparently very similar to those of *P. Harrisii* and *P. Gairdnerii*, which inhabit the same region. The individual procured, when first seen, was creeping up the trunk of a large yellow pine, (*P. brachyptera*,) searching for insects in the bark. Its cry was very like that of *P. Harrisii*. When shot, though killed, he retained his hold of the bark of the branch on which he sat, as woodpeckers so often do, and I was compelled to dislodge him with the contents of my second barrel, by which he was somewhat mutilated.

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MELANERPES FORMICIVORUS.

Woodpecker.

This beautiful bird, the rival and representative of the red-headed woodpecker, (*M. erythrocephalus*,) is an inseparable element of the scenery in the Sacramento valley.

While we were encamping under the wide-spreading oaks of that region I had a very good opportunity to study their habits, as they would come into the trees in the shade of which I was lying. They are not shy, and frequently came round in considerable numbers. Their manners are the very counterpart of those of the eastern "red-head," and their rattling cry is not unlike his. Like the "red-head," I have seen two or three of them amuse themselves by playing hide and seek around some trunk or branch, and, like the "red-head," too, they delight to sit on the end of a dry limb and fly off in circles for the insects which come near them. This bird is called "*carpentero*" by the Mexican and Spanish Californians, and is well known by the residents as the bird which pierces the bark of oaks and pines with holes, in which he inserts acorns, thus storing them up for future use. The holes are nicely adjusted to the size of the acorn, which, when driven in by the energetic blows of the "carpentero," can with difficulty be extracted.

The bark of the western yellow pine (*P. brachyptera*, Eng.) is particularly thick and cork-like, and is divided into plates of from four to eight inches in breadth, with smooth surfaces. Into these plates the carpentero sometimes inserts acorns in such numbers that all the trunk of the tree has the appearance of being thickly studded with wooden pegs.

The squirrels find these stores of acorns extremely convenient, and they become the occasion of unending battles between the carpentero and themselves.

The range of the species extends to the Columbia, and perhaps above, to the westward of the Cascade range, though more common in California than in Oregon. In the Des Chutes basin we did not see it, and in the Cascade mountains it is replaced by *M. torquatus* and *M. albolarvatus*.

MELANERPES TORQUATUS.

Lewis' Woodpecker.

This elegant and interesting bird, so unlike in the region it occupies, and in its retiring habits, the preceding species, seems to choose, as its favorite haunts, the evergreen forests which partially cover and conceal the ragged and rocky declivities of the Cascade and Rocky mountains.

I saw it first near Lassen's Butte in northern California, flying high in the air, when its flapping wings and its seemingly jet black color, led me to think it a crow diminished in size by distance. Soon, however, its flight brought it towards the sun, and by the reflected light, I saw that its color was of a deep and resplendent green, and recognized the bird. Subsequently we noticed them in the mountains all the way to the Columbia. Though often seen at a low elevation, it is evidently alpine in its preferences, for we found them most abundantly near the line of perpetual snow, and when crossing the mountain passes at the snow line have seen them flying far above us. While in the Cascade mountains, in September, I, one day, saw twenty or more, the greater part of them young birds, contending, half in sport and half in earnest, with a flock of robins (*T. migratorus*) for the possession of a clump of mountain ash, now

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covered with its crimson berries, on which they were feeding. From time to time several would meet on one of the high spruce "stubs" which stood near, and apparently, have rare fun dodging each other around it; in this and in their generic rattling note indicating their relationship to the "Red-head" of the east.

They are always shy birds, and difficult to shoot; yet elsewhere they may be less so, for, in the previously unexplored region of California and Oregon which we traversed, the birds were all much more shy and difficult of approach than those of districts populated by white men. In its fly-catching habits, this species closely imitates the Californian and eastern members of the genus.

MELANERPES ALBOLARVATUS.

White-headed Woodpecker.

This species we found only in the Cascade mountains of Oregon, where it is, apparently, not common.

COLAPTES MEXICANUS.

Red-shafted Flicker.

The Red-shafted Flicker is a rather common bird in all parts of California and Oregon which we visited. Many of its habits are identical with those of the Golden Flicker (*C. auratus.*) Like that species, he is often seen hopping along on the ground and seeking his food there, and the note, which has given to the eastern species the provincial name of "Wake up," is closely imitated by his western representative. The Red-shafted Flicker is, however, much the shyer bird.

APTERNUS ARCTICUS.

Three-toed Woodpecker

This Woodpecker we found only in the Cascade mountains, within a hundred miles of the Columbia.

GEOCOCCYX VIATICUS.

Road Runner. Paisaño.

This singular bird, which is quite common in southern California and Mexico, we found as far north as Fort Reading, at the upper end of the Sacramento Valley. It is there limited to the hilly districts, and frequents the chapparal of "*Manzanita*," *Arbutus laurifolia*, and "Grease wood," (*Ceanothus cuneifolius,*) which, with scattered trees of the long-acorned oak and the nut pine, (*Q. longiglandis* and *P. Sabineana,*) form the vegetation of the district. The piles and ledges of trap rock give shelter to great numbers of lizards, and these appear to compose the greater part of the subsistence of the "racer," as it is called, its swiftness of foot being proverbial there, as in all localities where the bird is known.

The *Geococcyx* is found throughout the whole range of hills bordering the Sacramento valley on the east, becoming more abundant towards the south. It is frequently brought into the San Francisco market and is reported very good eating.

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?? COCCYZUS ERYTHROPHTHALMUS.

The Black-billed Cuckoo.

While encamped at Fort Reading, California, in July, 1855, I frequently saw and heard the "rain crow," in the trees bordering Cow creek. I supposed it to be this species, and made an entry to that effect in my note book; but I had then nothing to do with the collections in natural history, and did not secure a specimen.

COLUMBA FASCIATA.

The Band-tailed Pigeon.

This beautiful pigeon, of the size and much the habits of the domestic pigeon, I observed at several points on our route. At McCumber's, N. E. of Fort Reading, the first was seen and killed by Dr. Sterling. There they are not rare, and, during the season of acorns, subsist on those of the scrub oak, which abounds in that vicinity. On the Columbia they were in pairs, and near the Dalles might readily be mistaken for domestic "doves."

ECTOPISTES CAROLINENSIS.

The Turtle Dove.

The turtle dove is very abundant in all parts of California and Oregon which we visited.

CALLIPEPLA CALIFORNICA.

The California Quail.

This beautiful bird is now so widely and so well known that little can be said of it which will be new to naturalists. In California it is called the "valley quail," to distinguish it from *C. picta*, which, inhabiting the hills and highlands, has received the name of "mountain quail."

The place filled in the fauna of the west by the California quail corresponds with that of the quail or partridge of the eastern States, (*Ortyx virginiana.*) It inhabits the prairies and the grain fields of the cultivated districts, and frequents the thickets which border the streams, usually in covies of from a dozen to an hundred individuals, except during the breeding season, when it is found only in pairs. Like the eastern quail, the cock bird is very fond of sitting on some stump or log projecting above the grass and weeds which conceal his mate and nest or brood, and, especially in the early morning, uttering his peculiar cry, (whistle it can hardly be called,) which represents in a Californian scene the "bob-white," that, so clear and full, yet soft, so suggestive of rural pleasures, form one of the most delightful accompaniments of the pleasant harvest time in the eastern States.

The note of the Californian quail is rather harsh and disagreeable than otherwise, and somewhat resembles that of some of the woodpeckers. It may be represented by the syllables kŭck-kŭck-kŭck-kā—kŭck-kŭck-kŭck-kā—the first three notes being rapidly repeated, the last prolonged with a falling inflection.

As a game bird the Californian quail is inferior to the eastern one, though, perhaps, of equal excellence for the table. It does not lie as well to the dog, and does not afford as good sport. It also takes a tree more readily than our quail. It is found in all the valleys of California and Oregon, both those of the interior and those which open on the coast. It is not found in the

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deep forests, nor in the mountains at any considerable elevation, nor in the interior basin, where water and vegetation are scarce. Of the many specimens obtained, some were killed in different parts of the Sacramento valley, at Fort Jones, and in the Willamette valley, near the Columbia. There is no appreciable difference between these specimens.

These birds make no elaborate nests, but lay a large number of eggs on the ground, and generally hatch in June. They are susceptible of domestication, and would be a pretty ornament for parks and lawns in the Atlantic States, where they would probably thrive.

CALLIPEPLA PICTA.

The Mountain Quail.

This elegant bird, so similar to and yet so unlike the partridge of Europe, is nowhere so common as to make it a valueless prize to the sportsman or naturalist. It occurs sparingly throughout the entire length of California and Oregon to, and perhaps across, the Columbia, having much the range, in a general way, of the "valley quail," (*C. californica*,) though everywhere a rarer bird, and always confined to the hills or mountains, while the species just mentioned, as its name implies, inhabits the valleys or low hills.

The habits of this bird are similar to those of the other species of the genus, but it is less gregarious and more shy. It is usually found in the chapparal, where it is put up with difficulty, choosing to gain safety by running on the ground rather than by flight.

On the first of August, at the base of Lassen's butte, I found a solitary hen, with a brood of very young chicks. The brood scattered like young partridges, uttered a piping note like that of young chickens, and, when all was still again, were recalled to the mother by a *cluck*, much like the cluck of the common hen. Until we reached the plains of Pit river we frequently saw small covies and broods of these partridges, in which the young were about half grown. In the Klamath lake basin we did not observe them, most of that country being too flat and bare. We found them again in the hills bordering the Willamette valley, and they extend from the Columbia almost uninterruptedly, but no where abundantly, through the Siskiyou, Calapooya, and Trinity mountains to California. They are favorite pets with the lonely miners, by whom they are kept in confinement, and are frequently so much admired for their trim figures, elegant plumage, and chivalrous bearing, as to command a high price. Their flesh is white and excellent, and quite equal to that of any of the family.

TETRAO OBSCURUS.

The Dusky Grouse.

The dusky grouse among American species is only second in size to the "sage hen," *T. urophasianus*. The cock is decidedly the handsomest of all American grouse, and the flesh is white, and equal to that of the ruffed grouse or the American partridge, (*O. virginiana.*)

This bird inhabits the evergreen forests exclusively, and is found not uncommonly in the Sierra Nevada, in California, and in the wooded districts of the country lying between the Sacramento valley and the Columbia.

In the Cascade mountains we found it associated with the ruffed grouse, which it resembles in habit more than any other species. When on the ground they lie very close, flying up from your very feet as you approach them, and, when flushed, always take to a tree; while sitting in the tree you may fire as many times as is necessary to hit the bird before you can dislodge it. In the spring, the male, seated motionless on a branch of pine or fir where it issues from the

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trunk, makes a booming call, which, by a remarkable ventriloquial power, serves rather to mislead than direct the sportsman, and unless experienced in shooting this kind of grouse, he will be likely to spend much time, with nothing to show for it, in a vain search for the bird.

TETRAO UMBELLUS.

Ruffed Grouse.

This bird we did not see within the limits of California, in the lake basin, nor in that of the Des Chutes river, but in the wooded portions of the Cascade mountains and in the Willamette valley it was very abundant, and was killed in considerable numbers by the different members of our party.

The only difference which I noticed between the specimens obtained there and those found east of the Mississippi was in color, the Oregon specimens being generally darker.

The habits of the bird are, apparently, everywhere the same. Their excellence for the table is proverbial; but from their habit of living in wooded districts they are sometimes with difficulty put up, and are usually shot on the ground—affording less exciting and legitimate sport than species which are only killed on the wing.

TETRAO PHASIANELLUS.

The Sharp-tailed Grouse.

The sharp-tailed grouse is found associated with the "prairie chicken" (*T. cupido*) on the prairies bordering the Mississippi and Missouri, and is frequently confounded with that bird by the "pot hunters," who annually destroy immense numbers of both species. It is, however, easily distinguishable by its lighter plumage, speckled breast, and smaller size, and is always the least abundant of the two species when they exist together. The range of the sharp-tailed grouse extends much further westward than that of the prairie chicken, the latter species being limited to the valley of the Mississippi, while the former is found as far west and south as the valleys of California.

Coming north from San Francisco, we first found it on a beautiful prairie near Canoe creek, about fifty miles northeast of Fort Reading; subsequently, after passing the mountain chain which forms the upper cañon of Pit river, we came into a level, grass-covered plain, through which the willow-bordered river flows in a sinuous course like a brook through a meadow. On this plain were great numbers of birds of various kinds, and so many of the sharp-tailed grouse, that, for two or three days, they afforded us fine sport and an abundance of excellent food. We found them again about the Klamath lakes, and in the Des Chutes basin quite down to the Dalles.

The flesh of this species is much like that of the "prairie hen," and, though not equal to that of the dusky or ruffed grouse, was always regarded as an acceptable addition to our bill of fare.

The bird lies close, and when flushed flies off, uttering a constantly repeated kuck, kuck, kuck, with a steady flight and considerable swiftness. It is, however, tender and easily killed, No. 4, and even No. 6, shot being, if properly directed, sure to bring them down when within moderate range. The young birds, being fat and heavy, as they fall on the grassy prairie scatter their feathers about as though torn quite in pieces, giving gratifying evidence of their fitness for the table.

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TETRAO UROPHASIANUS.

Sage Cock.

This is the largest of American grouse, the male sometimes weighing from five to six pounds. It is, when in full plumage, rather a handsome bird, at least decidedly better looking than any figure yet given of it. The female is smaller than the male, and of a monotonous sober brown; but the male, brown above, is handsomely marked with black and white on the neck, breast, and wings, and has a distinctive character in the spaces of bare, orange colored skin which occupy the sides of the neck. These spaces are usually concealed by the feathers, but are susceptible of inflation to a great size, and, when strutting in parade before the females, the neck is puffed out like that of the pouter pigeon.

This bird does not inhabit the valleys of California, but belongs to the fauna of the interior basin, or, more probably, to the Rocky mountain fauna—that of the dry, desert country lying on both flanks of the Rocky mountain chain. We first met with it high up on Pit river, at the point where we left it and crossed over to the lakes. Coming into camp at evening, I had been attracted by a white, chalk-like bluff, some two miles to the right of our trail, which I visited and examined. Near it was a warm spring, which came out of the hill-side, and, spreading over the prairie, kept a few acres green and fresh, strongly contrasting with the universal brown of the landscape. In this little oasis I found some, to me, new flowers, many reptiles, and a considerable number of sharp-tailed grouse, of which I killed several; the whole presenting attractions sufficiently strong—as we were to remain encamped one day—to take me over there early next morning. I had filled my plant case with flowers, had obtained frogs and snakes and chalky, infusorial earth enough to load down the boy who accompanied me, and had enjoyed a fine morning's sport, dropping as many grouse on the prairies as we could conveniently carry. Following up the little stream toward the spring on the-hill side, a dry, treeless surface with patches of "sage bushes," (*artemisia tridentata,*) I was suddenly startled by a great flutter and rush, and a dark bird, that appeared to me as large as a turkey, rose from the ground near me, and, uttering a hoarse *hēk, hēk*, flew off with an irregular, but remarkably well sustained flight.

I was just then stooping to drink from the little stream, and quite unprepared for game of any kind, least of all for such a bird, evidently a grouse, but so big and black, so far exceeding all reasonable dimensions, that I did not think of shooting him, but stood with open eyes, and, doubtless, open mouth, eagerly watching his flight to mark him down. But stop he did not, so long as I could see him, now flapping, now sailing, he kept on his course till he disappeared behind a hill a mile away.

I was, of course, greatly chagrined by his escape, but, knowing that given one grouse it is usually not difficult to find another, I commenced looking about for the mate of the one I had lost. My search was not a long one; almost immediately she rose from under a sage bush with a noise like a whirlwind, not to fly a mile before stopping to look around, as the cock had done, but, by a fortunate shot, falling helpless to the ground. No deer stalker ever felt more triumphant enthusiasm while standing over the prostrate body of a buck, or fisherman when the silvery sides of a salmon sparkled in his landing net, than I felt as I picked up this great, and to me unknown, bird. I afterward ranged the hill-sides for hours, with more or less success, waging a war on these birds, which I found to be quite abundant, but very strong winged and difficult to kill. I repeatedly flushed them not more than ten yards from me, and, as they rose,

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poured my whole charge right and left into them, knocking out feathers, perhaps, but not killing the bird, which, in defiance of all my hopes and expectations, would carry off my shot to such a distance that I could not follow him, even did I know he would never rise again. Here, as elsewhere, I found these birds confined to the vicinity of the "sage bushes," from under which they are usually sprung.

A few days later, on the shores of Wright and Rhett lakes, we found them very abundant, and killed all we cared to. A very fine male which I killed there was passed by nearly the whole party within thirty feet in open ground. I noticed him as soon, perhaps, as he saw us, and waited to watch his movements. As the train approached he sank down on the ground, depressing his head, and lying as motionless as a stick or root, which he greatly resembled. After the party had passed, I moved toward him, when he depressed his head till it rested on the ground, and evidently made himself as small as possible. He did not move till I had approached to within fifteen feet of him, when he arose and I shot him. He was in fine plumage, and weighed over five pounds. We continued to meet with the sage hen, whenever we crossed sage plains, till we reached the Columbia.

To the westward of the Cascade Range this bird probably does not exist, as all its habits and preferences seem to fit it for the occupancy of the sterile and anhydrous region of the central desert. Its flesh is dark and, particularly in old birds, highly flavored with wormwood, which to most persons is no proof of excellence. The young bird, if parboiled and stewed, is very good; but, as a whole, this is inferior for the table to any other species of American grouse.

GALLINULA GALEATA.

Gallinule.

I saw this bird but on one occasion, at San Francisco, and that in the month of November.

FULICA AMERICANA.

The Coot.

Abundant in all parts of Oregon and California, where it is a constant resident.

RALLUS ELEGANS.

King Rail.

Very common in the marshes bordering San Francisco and San Pablo bays, in California. At Petaluma they are very numerous, and called "mud hens." During the game season they are always to be found in the California market.

RALLUS VIRGINIANUS.

Virginia Rail.

This little rail is common along the smaller streams throughout California and Oregon.

We saw it first at Vacaville, a few miles above Benicia, and subsequently in many localities northward. I also received a specimen from Lieutenant Trowbridge, U. S. A., killed at Cape Flattery, Washington Territory.

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CHARADRIUS VOCIFERUS.

Killdeer.

The killdeer plover is everywhere common throughout California and Oregon. Scarcely a day passed on our march in which we did not see them.

CHARADRIUS VIRGINIACUS.

The Golden Plover.

Perhaps less common than in the eastern States, but not rare in California and Oregon.

GRUS CANADENSI .

The Brown Crane.

This, the only species of crane which we saw at the west, is quite common, at different seasons, in nearly all parts of California and the Pacific territories. In the autumn and winter it is abundant on the prairies of California, and is always for sale in the markets of San Francisco, where it is highly esteemed as an article of food. In August, we frequently saw them about the Klamath lakes, and early in September, while in the Cascade mountains, in Oregon, the cranes were a constant feature of the scenery of the beautiful but lonely mountain meadows in which we camped.

We found them always exceedingly shy and difficult of approach, but not unfrequently the files of their tall forms stretching above the prairie grass, or their discordant and far-sounding screams suggested the presence of the human inhabitants of the region, whose territory was now, for the first time, invaded by the white man.

The cranes nest in these alpine meadows, and retreat to the milder climate of the valleys of California on the approach of winter. In Oregon they begin to move southward in October.

ARDEA HERODIAS.

Great Blue Crane.

This bird is more common in California than in any portion of the eastern States with which I am familiar. On San Pablo bay, in the Straits of Carquines, and along up the Sacramento one is rarely out of sight of them, and not unfrequently half a dozen or more are seen together, either sitting on the low trees or watching in the shoal water for their food. On Pit river, in the lake basin, on the Des Chutes, Willamette, and Columbia, we found them abundant, but nowhere so numerous as in the Sacramento valley.

Specimens were given me by Lieutenant Trowbridge, U. S. A., collected at Cape Flattery, and I have seen them from still further north. All agree closely in plumage with the eastern bird, and its habits are everywhere the same.

ARDEA OCCIDENTALIS.

The White Heron.

We saw the white egret in several different localities on our route, but most abundantly on San Pablo bay, where we killed several, and where, sitting so white and motionless at intervals along the shore, they give a peculiar character to the landscape.

They were found by us on the Columbia, and they range still further northward.

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ARDEA MINOR.

The American Bittern.

The bittern, like the blue heron, is common throughout California and Oregon. On upper Pit river we saw large numbers of them.

ARDEA EXILIS.

Least Bittern.

This little heron we found rather common along the Sacramento, but not northward of the Sacramento valley.

TOTANUS FLAVIPES.

The Yellow Shanks Tatler.

This bird we saw occasionally in California and Oregon. At Rhett lake and Klamath marsh, which last is half marsh, half lake, and the resort of incredible numbers of water fowl, we found the yellow shanks abundant.

TOTANUS MELANOLEUCUS.

The Tell-Tale.

Not uncommon in the vicinity of San Francisco and on the Columbia.

TRINGA ALPINA.

The Dunlin.

Common about San Francisco and on the Columbia.

TRINGA SEMIPALMATA.

Semipalmated Sandpiper.

Common about San Francisco, California.

PHALAROPUS FULICARIUS.

We saw this species in small flocks, sometimes thirty or forty miles from land, off the coast of California, in November and December, 1855.

PHALAROPUS HYPERBOREUS.

I found this interesting bird evidently spending the summer on the upper branches of the Des Chutes river, in the Cascade mountains, in Oregon. At the time of our visit to that region the period of nesting had long passed, and the broods were living together till such time as their annual migration should commence.

I was particularly interested by the sprightly, sportive habits of these birds, and by the elegance of their movements on the water. Sometimes, as I sat quietly on the banks of the river, a little company of these neatly dressed phalaropes would float by, quite careless of the fact that they were borne rapidly down by the current, and wholly occupied in their sports, circling about each other with the ease and grace of skaters on ice, or swallows in the air. When alarmed they flew swiftly up the stream, uttering a *peet, peet,* much after the manner of the sandpipers.

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NUMENIUS LONGIROSTRIS.

Curlew.

The curlew is quite abundant in the vicinity of San Francisco and throughout the Sacramento valley during the autumn and winter. In the summer and before the commencement of the rainy season comparatively few of them are found there. On our march through the Sacramento valley and northward we did not meet with it until we came down into the plains bordering Pit river above the upper cañon; here we found them in immense numbers, and they formed a valuable addition to our bill of fare. This prairie is entirely covered with water during the wet season, as is proven by the myriads of aquatic shells (*Planorbis, Physa, &c.*) scattered over the ground in the grass; and as it does not dry up so completely as the other vallies, the curlews apparently pass the summer there. Around the Klamath lakes and others of that group they were abundant in August, and we found them associated with the geese and other water birds which were congregated in countless numbers on the lowlands bordering the Columbia in October.

HIMANTOPUS N RICOLLIS.

The Black-necked Stilt.

We found this bird in large numbers on the shores of Rhett lake, on the line between California and Oregon. This lake, one of a group of which upper Klamath lake is the largest, is exceedingly shallow, and nearly half its surface is occupied by patches of "*tule*" (bull-rush,) which has given it the name by which it is sometimes called "Tule lake." These wide surfaces of shoal water and low islands, densely covered with rushes, afford most convenient retreats for a large number of swimming and wading birds, which nest and pass the summer there. Ducks, geese, herons, plovers, and sandpipers were very numerous, but the most conspicuous of all were the stilts, both for their numbers and their vociferous cries. When alarmed by the approach of our party and the firing of guns, they flew about in the greatest confusion, their long legs trailing behind them, and keeping up a loud and incessant scolding. I obtained a fine pair of these birds, male and female, which with several other desirable specimens procured at that time were subsequently lost.

The Stilt is found as far north as the Columbia, and is not uncommon in the valleys of California.

RECURVIROSTRA OCCIDENTALIS.

The Western Avoset.

Common on the marshes about the principal bays and water courses of California during fall and winter. It is then brought into the San Francisco market in considerable numbers and sold as an article of food. How great are its excellencies in this line I did not learn.

In the spring it migrates to the northward, nesting almost exclusively above the Columbia.

This species resembles in appearance, as well as in habits and cry, the *R. Americana* of the Atlantic coast, and still more than that species is like the avoset of Europe.

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LIMOSA FEDOA.

Godwit.

Very common about San Francisco in the winter, and is always to be found in the market. It is also common on the Columbia near its mouth, and I received a specimen from Lieutenant Trowbridge, U. S. A., killed at Cape Flattery, W. T.

SCOLOPAX WILSONI.

Wilson's Snipe.

Wilson's snipe is shot in considerable numbers about San Francisco, and is constantly in the market during the autumn and winter. We saw them on the shores of Klamath lake, and at various points along our line of march.

SCOLOPAX GRISEA.

Red-breasted Snipe.

This species, though less common than the last, is found occasionally in California and Oregon.

CYGNUS BUCCINATOR.

Trumpeter Swan.

The trumpeter swan visits California and Oregon with its congeners, the ducks and geese, in their annual migrations, but, compared with the myriads of other water birds which congregate at that season in the bays and rivers of the west, it is always rare. Before we left the Columbia, early in November, the swans had begun to arrive from the north, and frequently while at Fort Vancouver their trumpeting call drew our attention to the long converging lines of these magnificent birds, so large and so snowy white, as they came from their northern nesting places, and, screaming their delight at the appearance of the broad expanse of water, perhaps their winter home, descended into the Columbia.

CYGNUS AMERICANUS.

Common Swan.

This bird, considerably smaller than the last, is perhaps more common at the west. In California swans are much less common than on the Columbia, where, during the winter season at least, they are exceedingly abundant.

BERNICLA CANADENSIS.

The Canada Goose.

The Canada goose, with several other species, becomes incalculably numerous in the valleys of California during the wet season. Some approach to this abundance of wild fowl is annually witnessed by the inhabitants of the prairie region of the valley of the Mississippi; but any exhibition of the kind which takes place in Illinois or Iowa is far surpassed by that of the

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Sacramento and San Joaquin valleys. With the first October rain vegetation begins to spring over all these prairies, and the geese and ducks now come in. Flock after flock in increasing numbers they come, until their flights rival those of the passenger pigeon, and the heavens are always marked by their characteristic triangles, and the air filled with their cries.

The ducks descend to the bays, streams, and lakes, and almost cover the smaller bodies of water, while the geese settle on the prairie and feed upon the fallen grain of the oat, or the first tender sprigs of the springing grass, which now begins to tinge the landscape with green.

The Canada goose is two or three weeks later in its arrival than the smaller species with which it is associated, and is always outnumbered by them.

The market men of San Francisco have a fancy that the "honkers" of the west are considerably larger than those of the eastern States; but I suspect this is a mistake, probably occasioned by the great difference of size between the Canada goose and the white-fronted snow goose, &c., which are so abundant at the same time. I remarked no difference in size or markings between the geese of this species in San Francisco and those I had seen on the great lakes.

In August we found Canada geese in the marshes about the Klamath lakes and on some of the small lakes in the Cascade mountains. They evidently breed in these localities.

BERNICLA HUTCHINSII.

Hutchins' Goose.

This is the smallest and most abundant of all the geese which I saw in California. It bears a striking resemblance to the Canada goose, of which it seems a miniature copy. I do not remember to have seen any which exhibited a white ring around the neck as distinctly as in Cassin's figure of *Bernicla leucopareia,* and I can hardly suppose that the western goose, which has been called Hutchins', is, in fact, *B leucopareia,* nor that, if distinct, this is a common bird in California.

ANSER HYPERBOREUS.

The Snow Goose.

This bird, so rare in the eastern States, is exceedingly abundant in California during the winter. As far as my own observation extended, it was not, however, the most common species, its relative abundance being less than that of either *A. Hutchinsii* or *A. erythropus,* Hutchins' goose being the most abundant of all. I was much interested while on the prairies frequented by the geese in noticing the perfect harmony of intercourse which seemed to exist among the smaller species. They intermingled freely while feeding, and, when alarmed, rose without separation; and I have often seen a triangle flying steadily high over my head composed of individuals of three species, each plainly distinguishable by its plumage, but each holding its place in the geometrical figure as though it was composed of entirely homogeneous material, perhaps an equal number of the darker species, with three, four, or more pure, snow-white geese flying together somewhere in the converging lines.

ANSER ERYTHROPUS.

White-fronted Goose.

This goose, called "speckled belly" in the San Francisco market, is abundant during the winter in all the valleys of California. Like the greater part of the water fowl which arrive

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and depart with them, they migrate northward early in the spring, and pass the summer far above the Columbia, many of them spending the short season on the shores of the Arctic sea. With the approach of cold weather, they return toward the south, their numbers augmented by all the young of the season. They travel by stages, stopping, from time to time, in such places as afford them food, and remaining at these resting places till admonished by the frosts of the necessity of another movement. A large number remain in the valleys of Oregon during the winter, but by far the greater part pass on toward the valleys of California, where winter is almost unknown. They begin to appear in California early in October, but most of them arrive in November and December.

The present species is most highly esteemed of all the geese which come into the San Francisco market, good ones being worth from 75 cents to $1 per pair, while Hutchins' geese are worth but 50 cents per pair. These prices, where the expenses of living are so great, indicate their abundance.

The speckling of the under surface is a constant character in this species, though liable to considerable variation in degree. Among many hundreds which I examined, a few only were uniformly brown below.

ANAS BOSCHAS.

The Mallard.

Very common in all parts of the west visited by us. We found them breeding in many different localities in the interior, and on the mountain streams and lakes.

MARECA AMERICANA.

The American Widgeon or Baldpate.

Common in California, and on the Columbia and Willamette, in Oregon.

ANAS STREPERA.

The Gadwall or Grey Duck.

The gadwall is, apparently, not common in California, but I saw it occasionally in San Francisco in November and December.

DAFILA ACUTA.

The Pin-tail.

Common in California and Oregon in winter.

QUERQUEDULA CAROLINENSIS.

The Green-winged Teal.

This beautiful duck, the rival of the more gorgeous wood duck, is, like the mallard, universally diffused over the Pacific provinces. We found them breeding in the interior in summer, and congregated in great numbers, with other water fowl, on the Columbia and about San Francisco in winter.

AIX SPONSA.

The Wood Duck.

Common throughout California, Oregon, and Washington. There, as everywhere, when found, the handsomest of the family.

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PTEROCYANEA DISCORS.

The Common Blue-winged Teal.

Common throughout California and Oregon.

PTEROCYANEA CŒRULEATA.

The Western Blue-winged Teal.

This elegant duck I did not see in northern California nor Oregon, and suspect it to be always rare north of San Francisco. It is very common, however, south of that point, at Monterey, San Diego, &c., and ranges to Chile, S. A.

RYNCHASPIS CLYPEATA.

The Shoveler.

The shoveler is not uncommon in winter about San Francisco, where we frequently shot them.

FULIGULA MARILOIDES.

The Scaup Duck.

Common about San Francisco and on the Columbia.

AYTHYA VALISNERIANA.

The Canvas-back Duck.

The canvas-back is generally distributed and well known throughout California and the Territories of Oregon and Washington; and there, as in the eastern States, is the most highly prized for the table of all water birds. In the autumn and winter they congregate in large numbers with other ducks on the bays and rivers of California. At such times the San Francisco market is well supplied with them, and they command a price of from one dollar to one dollar and fifty cents the pair.

During the summer we found them more numerous than any other ducks in the lakes and streams of the Cascade mountains. In those solitudes they nest and rear their young, as we frequently saw the broods of young there, though the period of incubation had passed. They were common in the marshes bordering the Columbia in November, when, with geese and other ducks, they begin to retreat southward before the approaching winter. The number of canvas-backs which we saw while duck-shooting in the bays of San Francisco and San Pablo was astonishing.

The specimens which I obtained there seemed not to differ appreciably from those of the Atlantic coast; and even if it should be true, as some would have us believe, that the bird is there inferior in flavor to those of Chesapeake bay and the New Jersey marshes, I can testify that the western canvass-backs are quite eatable.

AYTHYA ERYTHROCEPHALA.

The Red-head.

This duck, like the canvas-back, is common in the San Francisco market, and, as everywhere else, is often sold and eaten *as* canvas-back. It is, however, an excellent bird for the table, and the cheat is not so bad after all, especially as very few of those who eat them could tell the difference by the flavor, unless the two species were brought to the table together.

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CLANGULA AMERICANA.

The Golden Eye.

Common in California and Oregon.

CLANGULA ALBEOLA.

The Buffle Head.

This pretty little duck, a kind of small edition of the golden eye, is very common about San Francisco, and is, perhaps, most familiar of all the ducks found there. It dives with great facility, and is not always readily killed when on the water. Like the golden eye, it is much more certainly secured by a shot while on the wing.

HARELDA GLACIALIS.

The Long-tailed Duck.

This Arctic species descends into California only during the severest cold of winter, and then only in inconsiderable numbers. It is rarely seen at San Francisco, but is common in winter at the mouth of the Columbia and on Puget's Sound.

OIDEMIA PERSPICILLATA.

The Surf Duck.

This sea duck is common about San Francisco, along the coast, and on the lower Columbia.

OIDEMIA FUSCA.

The Velvet Duck.

Common on the coast of California and Oregon.

OIDEMIA AMERICANA.

Scoter Duck.

Very abundant about San Francisco in winter.

The three preceding species of marine ducks, though more abundant during the winter than any other water fowl, are never brought into market, being considered too fishy and strong to be eaten even by the Chinese.

MERGUS CUCULLATUS.

The Hooded Mergauser.

Not uncommon in the vicinity of San Francisco; I did not see it elsewhere, but it is said to occur generally on the western coast.

MERGUS SERRATOR.

The Red-breasted Mergauser.

Abundant about San Francisco in winter. It is also common on the Columbia during part of the year. I frequently saw these birds in the markets, but suspect no one eats them but the Chinamen.

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LARUS EBURNEUS??

While in depot camp, on the Des Chutes river, 150 miles south of the Dalles of the Columbia, a beautiful white gull, which I supposed to have been of this species, was killed by Lieut. Crook, United States army, and brought to me. The specimen was afterward unfortunately lost, but my notes and recollections satisfy me that this was the bird. We were, at that time, two hundred miles from the ocean, and not nearer than about one hundred miles to any considerable body of water, the nearest being the Klamath lakes.

LARUS BONAPARTII??

Bonaparte's gull was not common in the coast of California during my visit, though their range is said to extend to the Columbia. On my return, in December, I noticed numbers of them in the bay of Panama, where they were fishing with the pelicans and often stealing from them.

LARUS CALIFORNICUS??

This gull seems to occupy, in its migrations, the entire western coast of North America. At the mouth of the Columbia, October, 1855, I observed them "sponging" their subsistence from the pelicans; and in November, in the bay of San Francisco, I again saw them similarly occupied. Compared with the associated species, these birds are generally rare.

LARUS GLAUCESCENS?

This gull is not very common in those parts of California and Oregon of which I had opportunities of studying the water birds. A few of them followed the steamer in the passage from the Columbia to San Francisco, and subsequently from San Francisco southward. They are, apparently, nowhere as abundant as the western herring gull, (*L. occidentalis.*)

LARUS HEERMANNI.

This pretty gull inhabits the bays and rivers of California quite generally, but nowhere in great abundance. We saw them at the junction of Feather river and the Sacramento more abundantly than elsewhere. On a rocky island, at the entrance of San Pablo bay, I shot one of these birds, in the dark plumage, and he fell on the rocks apparently dead; in a few minutes he manifested signs of life, and I took special pains to go to him and kill him as I thought very dead; half an hour after I was slightly surprised to see him take wing and fly off as smartly as ever, his intellect, however, was evidently disturbed, for he mounted as directly upward as possible, and as long as I could see him he was still ascending, going up till lost in the distance.

LARUS OCCIDENTALIS?

This is almost the only gull about the wharves of San Francisco, and is there incredibly abundant, sometimes almost filling the air and covering the water among the shipping. It has very much the appearance of its eastern representative, and is equally familiar, gluttonous, and noisy.

The shores of the bays of San Francisco and San Pablo are sometimes for many rods whitened with these birds, either seeking their food along the water's edge when the tide is out, or, when it is full, sitting lazily in groups, apparently waiting for the ebb.

It is found following up the course of the Sacramento for a hundred miles or more, and along

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the coast extends its range to the mouth of the Columbia and above. It is abundant at the Farallones, where it breeds, and we saw what I supposed to be the same species, but apparently smaller and the colors all brighter, down the coast to Acapulco and below, following the steamer in numbers especially large off the island of San Marguerita, being there accompanied by the ring-billed gull (*L. zonorhyncus?*) and the short-tailed albatross (*D. brachyurus.*)

DROMEDEA NIGRIPES.

Black-Footed Albatross.

This albatross, of which I obtained a young specimen, agreeing in every respect with Audubon's description of *D. nigripes,* is abundant along the entire Pacific coast, from the mouth of the Columbia to Cape St. Lucas. How far to the north it ranges I am unable to say, but it is found, at least, as far up the coast as the Russian possessions. It may also descend lower than the entrance of the Gulf of California, but in going up the coast we first noticed them at about that latitude, and, coming down, we had more or fewer of these birds in sight all the way from Astoria to San Francisco, and subsequently from San Francisco southward, till we passed Cape St. Lucas, when they gradually left us, and we saw them no more. A marked change in the temperature takes place in passing this point, usually requiring a change in the clothing of the passengers on the steamers, so that it is probable this is the natural southern limit of the range of this species in that sea.

TACHYPETES AQUILUS.

The Frigate Pelican.

These birds are quite common off the coast of California. While on the steamer we frequently saw them floating about, high in the air, their wings entirely motionless and seeming as though sustained by their own specific gravity. If, however, the busy throng of gulls, so carefully sweeping the sea for fish or carcass far below, were called together by the discovery of anything of that kind, as swift as an arrow from a bow the frigate pelican would shoot down into their midst to share the spoil.

I had no opportunity of testing the stories told of the piratical attacks of this bird upon the defenceless gulls, as I never saw one descend near the ship.

PHAETON AETHEREUS??

The Tropic Bird.

The tropic bird is not uncommon from lower California to Panama. Its pure white color, its fluttering flight, like that of a butterfly, and its long, streamer-like tail feathers will serve to point it out to the traveller.

CARBO PENECILLATUS.

Green Cormorant.

Of this splendid species a fine specimen was presented to us by Dr. Ayres, of San Francisco He obtained it at the Farallone islands, from which he returned on the day of our arrival in the city.

We did not find it anywhere along the coast, (though doubtless it visits the shore,) and it is

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evident that its favorite habitat is the rocky islands which lie scattered along, at greater or less distances from the main land of California, and of which the Farallones are the most conspicuous group.

Subsequently, on our return voyage from San Francisco to Panama, when several days out, a number of large, green cormorants, apparently of this species, at different times attempted to come on board. They would fly round and round the steamer, and when arrived in front of the bow would turn and fly directly aboard, hovering over the heads of the passengers who covered the decks, seeking a vacant spot on which to alight. Several times they perched upon the rigging, and, ultimately, one in desperation, flew directly in among the crowd of passengers standing on the bow of the boat, I ran forward to secure the specimen, when I saw him disappear over the side, where he was knocked by a brute—*not* one of the beef cattle. He went under the wheel, and, greatly to my regret, was killed, and I could not secure him. What can be the impulse which leads these birds to forget all their natural fear of man, and in spite of the smoke, the motion of the walking beam, and of the steamer, and the cries of the passengers, to persist in throwing themselves into their midst it is difficult to imagine. It may be hunger, for we were far from land, or it may be fatigue from long flight—a flight which they were only willing to terminate by rest on some solid foundation. Whatever the cause, the fact is of frequent occurrence, as I learn from the officers of the ship.

CARBO TOWNSENDII?

While collecting birds in the vicinity of San Francisco, I heard that, in San Pablo bay, a white-breasted cormorant was to be found in great numbers. As I had no knowledge of a bird answering to their description I resolved to go and secure specimens. I therefore chartered the good ship "Maid of the Mist," Duncan, master, of five tons burden, and getting aboard the necessary stores for the voyage, set sail for that unknown sea. Many were the ludicrous incidents, hardships, and vexations of that eventful trip. Among its experiences were a night spent in the fog of the straits, and another, a beautiful Saturday night, which came down upon us so calm and still as if deserted by the "fickle Maid of the Mist." We held a council in an open boat, in the geographical centre of San Pablo bay; after hours hard pulling, guided by the stars, we reached the ancient capital of the western empire, Vallejo. Though a large part of the spoils of that chase were lost through the vandalism of our skipper, who would throw overboard what was not good to eat; still I saved from the general ruin a sufficient number of the so-called "white-breasted cormorant." These cormorants were all of one species, and innumerable. I noticed a considerable variation in the amount of white on the breast, in some it was entirely wanting, while in others it was very conspicuous, as they sat on the rocks or flew over our heads.

I saw great numbers of the same species near Astoria, at the mouth of the Columbia.

I detected nothing peculiar in their habits.

SULA BASSANA.

The Gannet.

While making the passage from San Francisco to Panama more or less of these birds were in sight from the steamer nearly every day of our voyage. They range from California to the isthmus.

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SULA FUSCA.

The Booby.

The boobies are still more common than the gannets off the coast of California. On our outward voyage, with their characteristic stupidity, several of them came on board, apparently with no better motive than to gratify their curiosity, and when on the deck had no power to rise again.

PELECANUS FUSCUS.

Brown Pelican.

The brown pelican is very abundant on all parts of the Pacific coast which I visited. In the bay of Panama they are particularly numerous. At Acapulco a few may always be seen, while at the Golden Gate and the mouth of the Columbia their numbers are surprisingly great, and their goblin figures, flitting about, all head and wings, are inseparably connected with my remembrances of those localities.

This pelican is exclusively confined to the seacoast, and is never found, at least so far as my own experience goes, on the inland waters. On the contrary, the white pelican is almost as exclusively confined to the interior, and to bodies of fresh water.

About San Francisco, both outside of the Gate and on the bay, when near or on the water, one is scarcely ever out of sight of the brown pelican; yet I never saw the white pelican while residing there. It was only on going up into the interior, on Suisun bay and the Sacramento river, that we found the white species entirely replacing the brown.

On San Pablo bay the two species meet and mingle.

At the Golden Gate the habits of the brown pelican may be studied quite at one's leisure. Like many other aquatic birds, at nightfall they seek the broad expanse of the open sea, where they may float in safety and sleep rocked by the gentle swell of the ocean. Near the shore they would be exposed to the attacks of various foes; the turbulence of the breakers is, probably, not invocative of sleep, and, strange as it may seem, birds, as well as ships, unless ensconced in some snug harbor, are safer in a storm with a good offing. In every severe storm occurring upon the western coast more or less pelicans, ducks, and grebes are thrown wrecked and drowned upon the shore. This will be less wondered at than that fishes, the natural inhabitants of the watery element, should in great numbers share the fate of the birds.

After passing the night at sea, in the grey dawn of the morning the pelicans begin to move, trailing in long lines, just above the surface of the water, toward the shore, where they find their food. While shooting in the vicinity of San Francisco I passed several nights on the water in a little schooner which we had chartered for the purpose. As the day began to dawn, and the mist slowly to lift from the surface of the water, the birds which had flown seaward the evening before began to return. The long lines of uncouth and ghostly pelicans, dimly seen through the fog, slowly flapping their huge bat-like wings in funereal rank and silence, losing themselves again in the fog, formed a vision peculiarly spectral and unreal.

The habits of the brown pelicans of the Pacific coast agree closely with those of the pelicans inhabiting the Gulf of Mexico, described by Audubon. Their mode of fishing is the same. When flying along, perhaps twenty feet above the water, from time to time, with a spiral gyration, they plunge, sometimes quite beneath the surface, after their finny food, and almost invariably with success.

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Like the pelicans of the Atlantic, those of the west are compelled to fish for the gulls, too idle to supply their wants by their own efforts, at least while they have so patient and efficient friends as the pelicans, from whom they can sponge their living. At the mouth of the Columbia the pelicans which I saw fishing were always attended each by one or more small gulls, (*L. Belcheri.*) These gulls followed the pelican in its flight, and settled at its head when it made a successful plunge, snatching up any fish that might fall from its capacious gular sack. I did not notice that the pelican ever displayed the least resentment of the officious attentions of these little depredators. When, in December, we entered the bay of Panama, the brown pelicans were paying tribute to the black-headed gulls, the same which, according to Audubon, follow the pelicans in the Mexican Gulf.

A large number of the individuals of *P. fuscus*, which I saw on the western coast, were young birds in brown dress, and I was able to obtain specimens exhibiting three phases of plumage: 1st, ashy brown above and white below; 2d, ashy brown above and whitish brown below; 3d, head and neck all pure white, except a slight tinge of yellow in the cheeks; back and base of neck silvery gray, feathers white at centre, ashy on their margins. Of the many thousands which I saw, none exhibited the phase of plumage given by Audubon as that of the mature bird, viz: neck, half dark brown and half yellowish white, the colors occupying longitudinal divisions. I had Audubon's works in San Francisco, and examined the pelicans with particular reference to his descriptions, and I was so confident that no such bird as his mature *P. fuscus* was to be found in that locality, that I was disposed to regard the brown pelican of the Pacific as distinct from that of the Atlantic.

It is perhaps not generally known that the fishes on which the pelican subsists are usually of very small size, large numbers of them being taken at every plunge. In the pelicans which I shot about San Francisco, I found in some cases the stomach distended with a quart or more of little fishes, from one to four inches in length; and it was rare that I found any remains of large individuals.

The pelican has in its greatest development the apparatus which gives buoyancy to many swimming birds. I allude to the system of sub-cutaneous air cells. In the brown pelican the skin is separated from the muscles over a large part of the surface, by an interval of half an inch or more, wholly occupied by a series of membranous air vessels.

PELECANUS TRACHYRHYNCHUS??

The White Pelican.

The white pelican, though generally distributed over the country west of the Rocky mountains, is far outnumbered by the brown species. Their habitats are, however, quite distinct, and they do not often come in competition in the pursuit of their aquatic food.

The white pelican is rarely or never seen at San Francisco, at Astoria, or at any other place on the coast where the brown are so abundant; but as one leaves the coast, penetrating the interior, on all the large rivers and inland lakes he will be sure to find it, though never in great numbers. It seems to occupy the inland lakes and rivers quite across the continent, and is evidently a fresh water bird; while the brown species is as exclusively confined to the vicinity of salt water. While encamped on Klamath lake we several times saw flying over the tule marshes which border it a large white pelican, of which the wings seemed almost entirely black. It might have been the present species, but appeared to be distinct.

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COLYMBUS GLACIALIS.

Loon.

The loon inhabits all the waters of California and Oregon. The mountain lakes of the Cascade range we generally found occupied by one or more of these birds. Sometimes a single one, the only living thing visible, sailing slowly around over the surface, and from time to time raising its wailing cry, seemed the very embodiment of solitude.

When encamped beside one of these lonely lakes the silence of the night was frequently broken by the quavering cry of the loon, which came to us echoed from forest or mountain with an effect indescribably touching and sad.

PODICEPS OCCIDENTALIS.

Western Grebe.

I obtained specimens of this beautiful grebe on San Pablo bay, California, in November. On the lakes of the interior we saw nothing of it. It is probably nearly confined to the immediate vicinity of the coast. It occurs at the mouth of the Columbia.

PODICEPS ——?

Exceedingly abundant about San Francisco, and extending up the streams far into the interior. It is also common on the Columbia and the interior lakes of Oregon. This and the next species are sometimes brought into the markets of San Francisco, but are so "fishy" as to be uneatable.

PODICEPS CALIFORNICUS.

Common in the bays and streams of California and Oregon.

URIA TROILE.

The Foolish Guillemot.

This guillemot is exceedingly abundant along the coast of California, particularly in the rocky islands which lie in the Pacific, near the coast. At the Farallones they exist in great numbers, exhibiting the same tendency to congregate at the breeding season, and the same stupidity or devotion to their duties which has elsewhere earned them the name they bear. In the absence of domestic fowls in California, the demand for eggs in San Francisco has been almost entirely supplied from these islands, and a trade amounting to many thousands of dollars a year is kept up in eggs alone. The greater part of these eggs are those of the foolish guillemot.

URIA ——?

This small guillemot is not uncommon on the California coast.

MORMON CIRRHATUS.

Puffin.

I saw this bird only on two or three occasions in California. It is confined to the coast, and chooses in preference the rocky islands off shore. At the Farallones it is abundant, still more so along the coast northward.

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No. 3.

REPORT UPON THE LAND SHELLS COLLECTED ON THE SURVEY.

BY W. G. BINNEY,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

The terrestrial mollusks of the Pacific region of the United States are entirely distinct from those of any portion of the Union east of the Rocky mountains. No species has, as yet, been detected on both sides of this insurmountable barrier. The types, also, are quite different. Instead of the fragile, horn colored shell of our western States, the shells are large, solid, and endowed with the rich coloring of the tropical species. Our knowledge of them is still very imperfect. Future research will probably bring to light many new species and interesting facts relating to their habits and their geographical distribution.

The helices of California and Oregon are characterized by a very peculiar indentation and granulation of their surface, and often by the presence of a broad, revolving band on the body whorl. This latter peculiarity exists in one-half of the species hitherto observed.

None of the shells brought by this expedition are new to science. I have, however, given full descriptions of all, as those that have been published are very brief, and some have not been noticed by American authors.

The measurements are given in millimetres, the French system being the most convènient and the one generally adopted by European naturalists.

No. 1. HELIX FIDELIS, Gray.

Testa subconica, solida, alba, castanea aut nigra, striata, et lineis volventibus induta; spira elevata; anfr. 7 regulariter accrescentes, fasciâ nigrâ aut castaneâ cincti; sutura impressa; subtus convexa, lævigata, nigra, profunde umbilicata; apertura depresso-rotundata, intus fasciata; columella callo levi induta; labrum album aut fuscum, ad umbilicum reflexiusculum.

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